Technical Memorandum WHOI-03-97

Woods Hole
Oceanographic
Institution

Bathymetry and Sediment Thickness Survey of the Hawaii-2 Cable

Cruise Report for KIWI Expedition
Leg 2 on the R/V Roger Revelle

by

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August 11–21, 1997

Technical Memorandum

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BATHYMETRY AND SEDIMENT THICKNESS SURVEY OF THE HAWAII-2 CABLE

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Executive Summary

The primary purpose of this cruise was to identify at least two potential observatory sites along the Hawaii-2 cable that would be suitable for drilling a hole to basement. There is a funded program, the Hawaii-2 Observatory (H2O), to install a junction box on the cable about mid-way between California and Hawaii (Figures 1 and 2). We want to identify sites in advance so that drilling will be possible near the observatory. This will permit a large range of borehole experiments to be carried out continuously and in real time. Based on available data we chose a section of cable between 140° and 143°W. This cable lies on a ribbon of 'normal' oceanic crust with well defined magnetic anomalies and relatively smooth bathymetry. The goals were to acquire SEABEAM bathymetry data and single channel seismic reflection data along this section of cable, to identify at least two potential sites along the cable and to carry out SCS surveys within about 10km radius of the sites.

Without further processing of the 3.5KHz and SCS data it is dangerous to commit to definitive conclusions. However if we interpret the diffraction events in the SCS data as occurring at the sediment-basement boundary we get a very uniform sediment thickness of about 50m. This may get as thick as 75m in some areas but in no area did we identify at least 100m of sediment. We need to discuss with the ODP drilling engineers their thoughts on drilling a re-entry hole in 50-75m of sediment. The nominal guideline has been a minimum of 100m but the sediments (red clays) here may be more rigid (they are certainly less transparent) than the nannofossil ooze found in other areas. Also, since in this area it seems that we do not have much choice, it could be argued that we should at least try a re-entry cone and casing in thin sediment.

We assume that ROV and submersible operations will be easier in flat, uniformly sedimented areas with low acoustic sidescan backscatter. About half of the cable track between 140° and 143°W consists of such flat areas (Figure 3). We chose three sites for more detailed surveying, and at each site we have specified a potential H2O Observatory location. All of the seafloor between 140° and 143°W is deeper than 4000m so the H2O site will be too deep for Alvin operations.

Site Sarah (27°59.4'N, 140°50.5'W, Figure 4) is our first choice since we have extensive SCS data at the site (a complete survey at 1.2nm spacing over a 10nmx10nm area).

Although we only have analog paper records of SCS data at Site Emily (28°37.4'N, 140°23.1W, Figure 5), it is our second priority because the bottom was extremely uniform. The sub-bottom diffractions common in most other areas are quite rare here. The bottom seems to consist of flat, homogeneous basaltic flows covered by uniform sediment. Once we understand the relation between the bottom reflection and sediment thickness by analyzing digital data at the other sites we should be able to estimate the thickness at Site Emily from the analog records.

Site Nick (27°25.2N,140°53.0'W, Figure 6) does not have as large a flat area as the previous two sites. It is interesting more for its lateral variability. We do have four SCS lines at 1nm spacing across the site. There is a small pond (2x4 nm) spanning the cable track which may be suitable for an observatory site if Sites Emily and Sarah are unacceptable for other reasons.

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BATHYMETRY AND SEDIMENT THICKNESS SURVEY OF THE HAWAII-2 CABLE

R.A. Stephen, S.A. Swift and R. Greaves
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Introduction

The primary purpose of this cruise was to identify at least two potential observatory sites along the Hawaii-2 cable that would be suitable for drilling. There is a funded program, the Hawaii-2 Observatory (H2O), to install a junction box on the cable about mid-way between California and Hawaii. We want to identify sites in advance so that drilling will be possible near the observatory. Based on available data we chose a section of cable between 140° and 143° West. This cable lies on a ribbon of 'normal' oceanic crust with well defined magnetic anomalies and relatively smooth bathymetry. The goal was to acquire SEABEAM bathymetry data and single channel seismic reflection data along this section of cable, to identify at least two potential sites along the cable and to carry out SCS surveys within about 10km radius of the sites.

Since the H2O cable has been given to the scientific community it is a valuable resource for research. While transiting to and from the site we felt that it would be worthwhile to acquire SEABEAM data along as much of the cable track as possible. This 'spec' data, Seabeam and magnetometer data between 130°W and 155°W may be useful to other investigators in the future.

Site Criteria

We would like to have a hole drilled near the H2O Observatory so that a suite of borehole experiments could be carried out which take advantage of the real-time data and power supply capabilities of the cable. The borehole should be a re-entry hole so that experiments can be carried by wireline or submersible assisted re-entry. The drilling community have a guideline that at least 100m of sediment is necessary to set a re-entry cone. Also procedures for installing the junction box would go more smoothly if carried out over relatively smooth topography.

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The location of the cable was determined at way points by star fixes and dead reckoning when the cable was laid in 1964 (Figures 1 and 2). These fixes are probably accurate to plus/minus two miles. So we need to select sites that are about 10miles on a side and which have relatively uniform properties across them. This will ensure that wherever the cable is found within the area, the site will be suitable. We estimate that the borehole would be drilled up to a kilometer (half a mile) from the junction box.

So we sought an area with the following characteristics: i) flat, SEABEAM bathymetry, ideally just noise contours, over an area about 10miles on a side; ii) low and uniform, sidescan backscatter amplitudes which indicate a smooth, sedimentary bottom; iii) at least 100m of sediment thickness over the area, and as uniform a sediment thickness as possible.

Narrative

We cast off from Fisherman's Wharf at 223-2140 on a clear but windy afternoon. The views of Alcatraz and the Golden Gate were terrific. After dropping off the pilot and clearing the control zone for San Francisco harbor, we steamed for the cable location at 130°W. The cable actually goes to San Luis Obispo in California but we chose the 130°W point since it presented minimal delay in our overall schedule.

We joined the cable track at 225-1230, deployed the magnetometer and began acquiring SEABEAM data along the cable. This 'spec' data could be potentially useful to other scientists planning experiments with the cable.

At 227-0140 we put the air gun in the water. This was a Seismic System Inc. Gas Injection Gun run in 'pure GI mode'. The generator chamber was 45 cubic inches and the injector chamber was 105 cubic inches. We estimated that it was towed at a depth of 8m or less. The streamer consisted of two active sections and we estimate that it was towing at a depth less than 20m. The digital data was acquired on an a2d acquisition system written by Mike Simpson and Greg Moore at SOEST. We tested the guns until we reached our survey area at 140°W at 227-1230.

We followed the cable track until we found an area that met our site criteria. The first site at about 140°40'W was labeled Emily, and Seabeam and SCS surveys were carried out between 227-1915 and

Hawaii-2 Cable and Observatory Locations

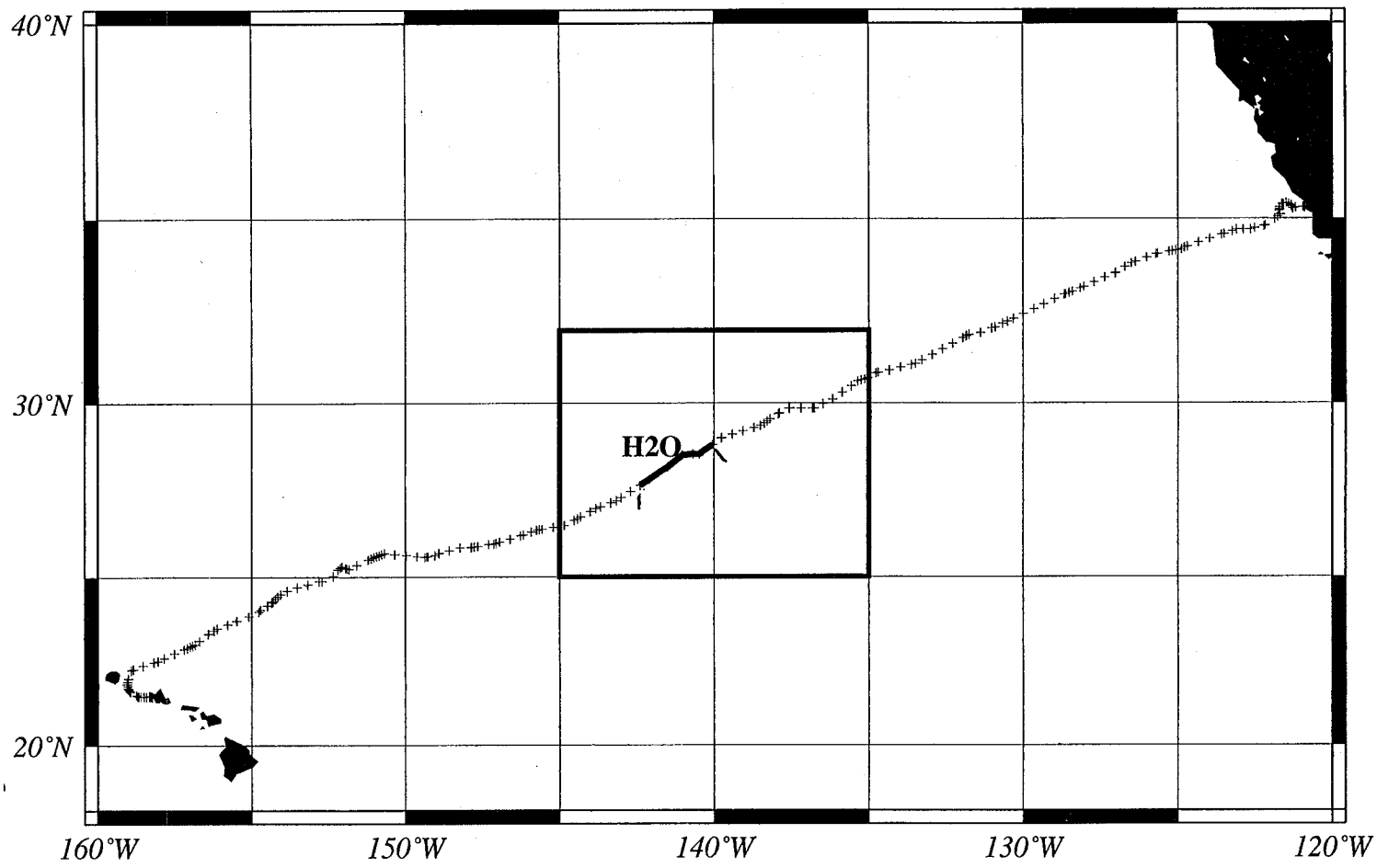

Figure 1: The locations of the repeater boxes for the Hawaii-2 cable (+) are shown. The bold box around the mid-point of the cable is the area shown in Figure 2. The H2O observatory should be located between 143°Wand 140°W(bold line on the cable track).

Bathymetry Along Hawaii-2 Cable

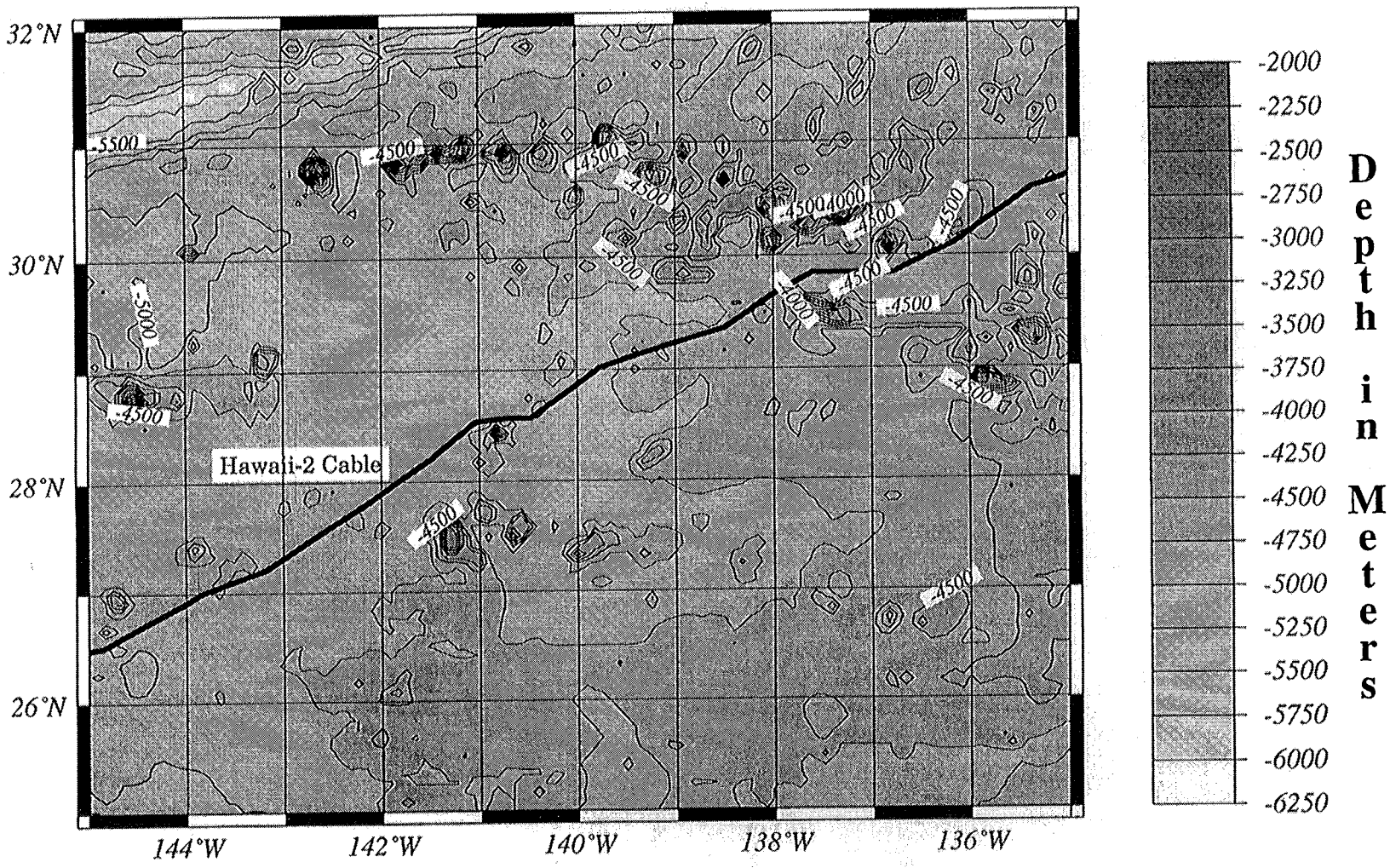

Figure 2: The bathymetry around the mid-point of the cable at 140° W is between 4250 and 5000m. The seamounts in the northeast are the Moonless Mountains. East of 140° W is a tectonically disturbed zone.

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228-1115. The second site at about 142°W was labeled Sarah and the survey was carried out between 229-0215 and 229-1800. Just prior to the second site we discovered that the acquisition system was not storing the digital seismic data. At the end of the survey area (near 143°W) we had some extra time and we surveyed a third area labeled Nick. So in spite of the recording problems we were able to acquire digital data from two sites.

We pulled the gun on board and left the survey area at 230-1000. We continued to acquire SEABEAM, magnetometer and analog (paper) 3.5KHz spec data along the cable track to 155°W. We left this point at 232-2110 and had the magnetometer back on board by 232-2140.

We arrived at the sea buoy for Honolulu harbor at 233-1600 and were along side the dock at Snug Harbor by 233-1800.

The weather for the whole cruise was quite calm with gentle trade winds at our backs for the whole trip. The first and last couple of days were overcast but the week in the middle was mostly clear. We had light rain showers on the second last day.

Geological Description

The funded grant for H2O does not specify a particular site but the PI's would prefer that it be located near 140°W. Bathymetry from NGDC (National Geophysical Data Center) is shown in Figure 2. The cable runs south of the Moonless Mountains between the Murray and Molokai Fracture Zones (Mammerickx, 1989). Between 140°W and 143°W, water depths along the cable track are typical for the deep ocean, 4,250-5,000m; the crustal age varies from 45Ma to 50Ma (Eocene); and the sediment thickness to within the available resolution is about 100m or less. Prior to our cable survey cruise in August 1997, sediment thickness particularly was not well resolved along the track (Winterer, 1989).

Tectonically, the cable runs across the 'disturbed zone' south of the Murray Fracture Zone, between magnetic isochrons 13 and 19 (Atwater, 1989; Atwater and Severinghaus, 1989). In the disturbed zone substantial pieces of the Farallon plate were captured by the Pacific plate in three discrete ridge jumps and several propagating rifts. To avoid this tectonically complicated region and to be well away from

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the fracture zone to the south of the disturbed zone we should consider sites west of isochron 20 (45Ma) at about 140°W. The crust west of 140°W was formed between the Pacific and Farallon plates under 'normal' spreading conditions at a 'fast' half-rate of about 7cm/yr (Atwater, 1989; Cande and Kent, 1992). (The average half-rate quoted by Malahoff and Handschumacher (1971) in this region for anomalies 18 through 31 is 4.9cm/year. However a careful analysis of spreading rate based on the magnetic anomalies of Atwater and Severinghaus (Atwater and Severinghaus, 1989) and the ages of Cande and Kent (Cande and Kent, 1992), give a half-rate of 7cm/yr for anomalies 18-22 (38.5-48.9Ma), 4.9cm/yr from anomalies 22-25 and 1.7cm/yr from anomalies 25-31. The Hawaii-2 cable track between 140°W and 143°W lies on a 'normal' band of oceanic crust which spread at 7cm/yr.) At the time this crust was formed the Farallon plate had not split into the Cocos and Nazca plates and the ridge that formed this crust was the same as the present day East Pacific Rise.

Between 140°W and 143°W the Hawaii-2 cable is in the pelagic clay province of the North Pacific (Leinen, 1989). The sediments here are eolian in origin consisting primarily of dust blown from Asia. They are unfossiliferous, red clays. DSDP Leg 5 drilled a transect of holes in the pelagic clay province along longitude 140°W (McManus et al., 1970). Site 39 is north of the cable at latitude 32°48.28'N with an age of 60Ma. It has a sediment thickness of only 17m. Sites 40 and 41 are near the same latitude at 19°50'N with an age of about 67Ma.. Site 40 was drilled in an area of ponded sediments at the base of a large abyssal hill. Basement was not reached. Drilling terminated at a chert bed at 156m. The acoustic basement, the deepest horizon identified on the seismic reflection profiles, corresponded to the chert beds. Site 41 was drilled 15km from Site 40, but was considered to be more representative of the sediments in the general area. Basaltic basement was encountered at 34m BSF but there were no cherts. Site 39 is north of the Murray Fracture Zone and Sites 40 and 41 are south of the Molokai Fracture Zone. The actual 'ribbon' of crust on which the cable lies is between the two fracture zones and was not drilled on Leg 5.

Site 172 was drilled on Leg 18 between the Molokai and Murray Fracture zones but east of 140°W in the 'disturbed' zone (31°32.23'N, 133°22.36'W) at an estimated crustal age of 35-38Ma (Kulm et al., 1973). Sediment thickness above the basaltic basement was 24m. The sediment thickness from seismic reflection profiles had been interpreted as 90-105m. The discrepancy was attributed to "reverberations and thin sediment cover".

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Results

Without further processing of the 3.5KHz and SCS data it is dangerous to commit to definitive conclusions. However if we interpret the diffraction events in the SCS data as occurring at the sediment-basement boundary we get a very uniform sediment thickness of about 0.8sec two-way time or about 50m assuming 1500m/s sediment velocity. This may get as thick as 75m in some areas but rarely, if ever, exceeds 100m. We need to discuss with the ODP drilling engineers their thoughts on drilling a re-entry hole in 50-75m of sediment. The nominal guideline has been a minimum of 100m but the sediments (red clays) here may be more rigid than the nannofossil ooze found in other areas. Also, since in this area it seems that we do not have much choice, it could be argued that we should at least try a re-entry cone and casing in thin sediment.

Since the sediment thickness does appear so uniform, there is less of a constraint on the H2O Observatory location. We assume that ROV and submersible operations will be easier in flat, uniformly sedimented areas with low acoustic sidescan backscatter. About half of the cable track between 140° and 143°W consists of such flat areas (Figure 3). We chose three sites for more detailed surveying, and at each site we have specified a potential H2O Observatory location. All of the seafloor between 140° and 143°W is deeper than 4000m so the H2O site will be too deep for Alvin operations.

The major guidelines for determining the potential sites were uniformity of bathymetry, backscatter strength and apparent sediment thickness for 2nm either side of the cable and to be at least 2nm from a repeater location. Since the original cable locations were determined by celestial navigation and dead reckoning we have applied a +/-2nm error to the locations. So the cable could be anywhere within a 4km swath about the nominal location. Also to avoid pulling up a repeater we want to be at least 2nm from their locations.

Site Sarah (Figure 4) is our first choice since we have extensive SCS data at the site (a complete survey at 1.2nm spacing over a 10nmx10nm area). There is also an indication in the SCS data of a reflector within basement at about 100m depth BSF.

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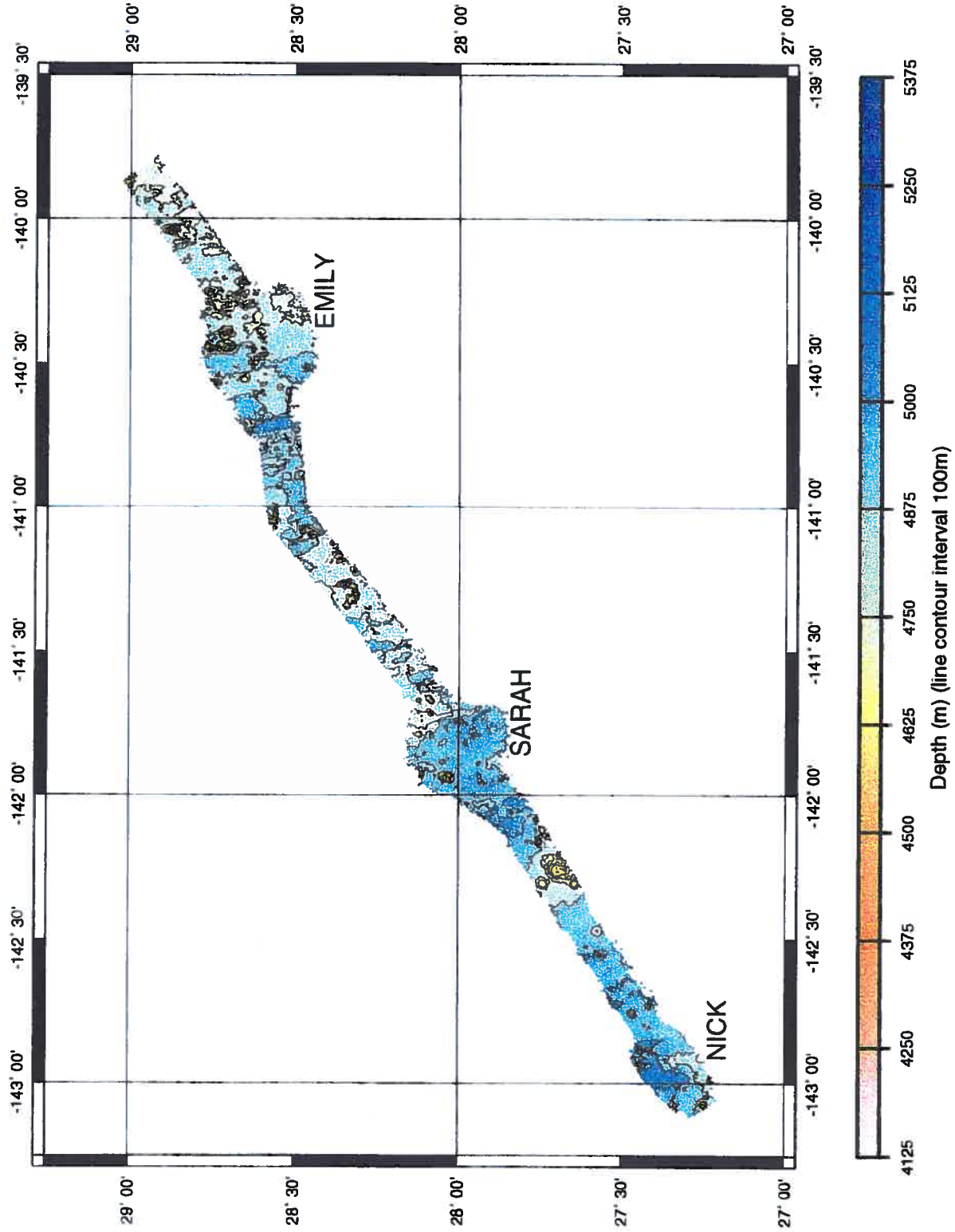

Figure 3: BATHMETRY - H2O Survey Area

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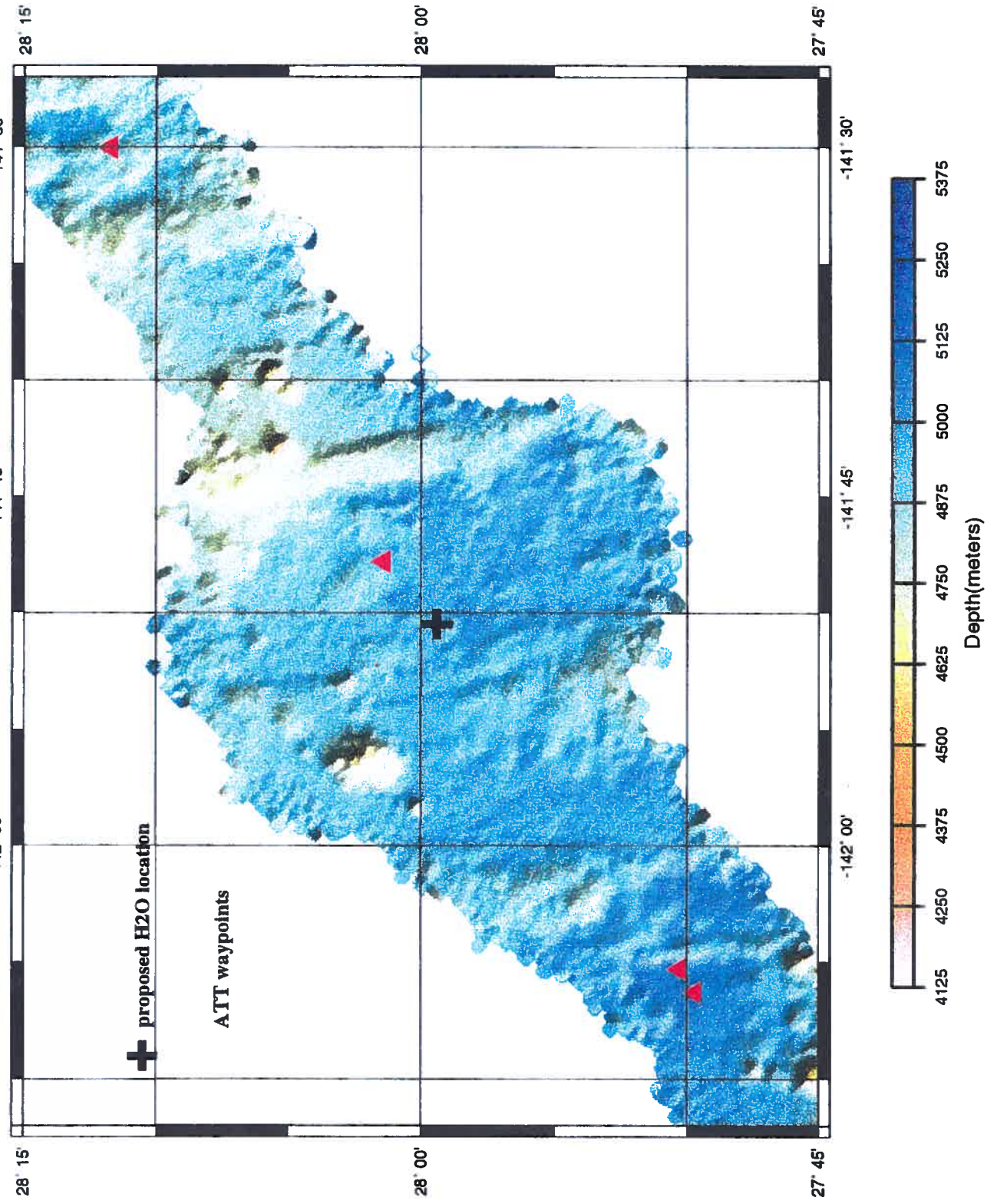

Figure 4a Bathymetry -- H2O Site SARAH

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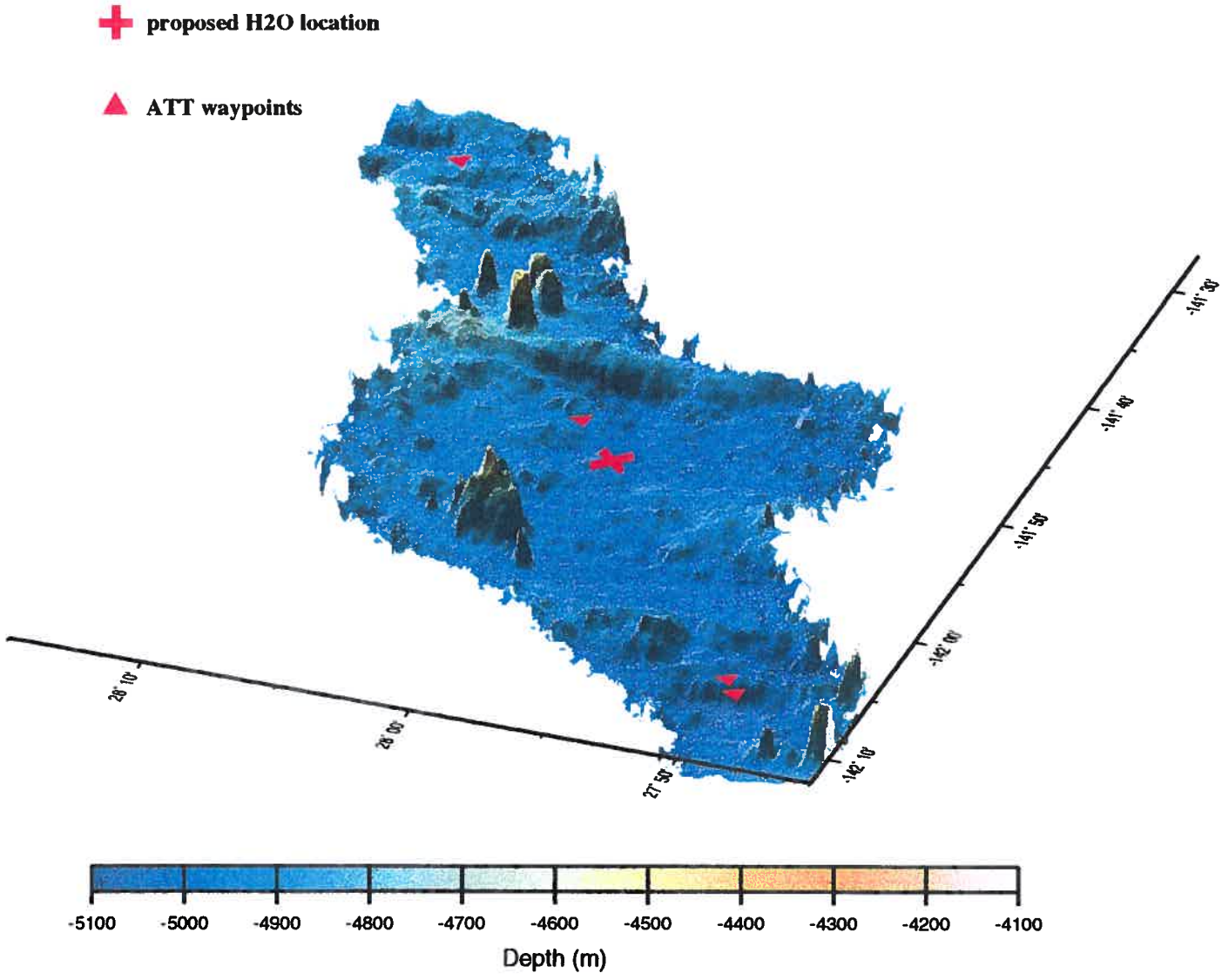
Figure 4b: Bathymetry - H2O Site SARAH



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Single Channel Seismics

We carried out a preliminary analysis of the single channel seismic data using the SIOSEIS system on board the Revelle. Seismologists who are accustomed to sources with strong bubble pulses and surface ghosts automatically assume that the first two or three cycles of a seafloor reflection are artifacts in the incident field. The gas injection gun outputs a single large spike with essentially no bubble pulse. When reflected from the sea surface it gives a single positive-negative pulse. We measured the width of the single large spike on the blast phone at the gun as 10msec. If a positive pressure spike from the gun at depth, z, hits the sea surface it will be reflected as a negative pressure spike. The resulting down going field below the gun will be the sum of the original positive pulse and the negative sea surface pulse delayed by 2z/v, where v is the water velocity. If the negative spike is delayed with respect to the positive spike by 10msec, the result will be a positive-negative doublet with a dominant period of 20msec corresponding to a dominant frequency of 50Hz. So by this reasoning, the proper depth of the gun should be 10msec x v / 2 = 7.5m or 1/4 of the wavelength of the desired pulse. We had estimated the gun depth at 8m so we assume that the incident field is pretty close to a single positive-negative wavelet with a dominant frequency of 50Hz.

Now the same interference effect of the free surface will occur at the receiver array. We have no idea about the depth of the array. If it is also near 7.5m the first peak of the wavelet will return 10msec after

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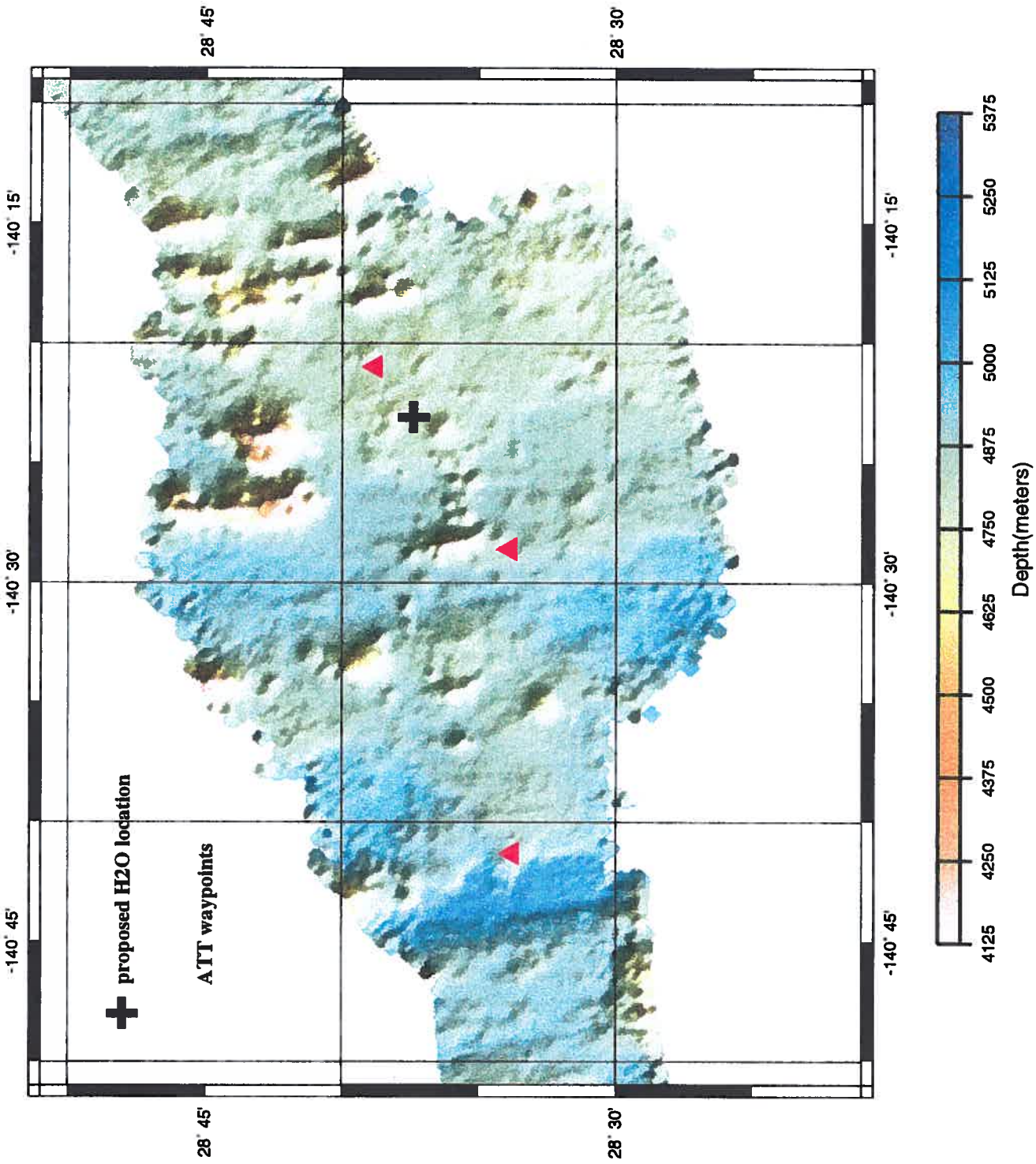

Figure 5a Bathymetry -- H2O Site EMILY

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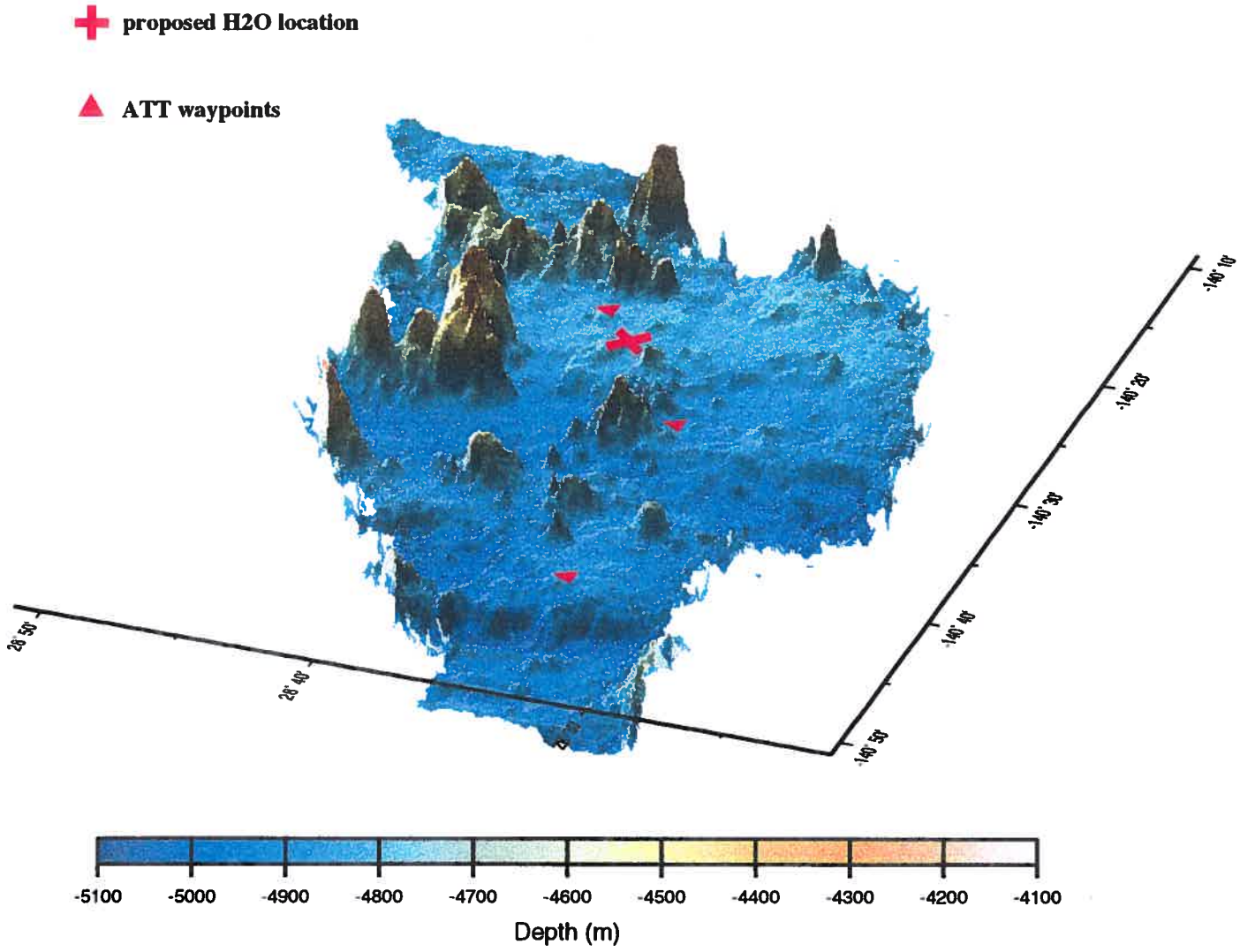
Figure 5b: Bathymetry - H2O Site EMILY



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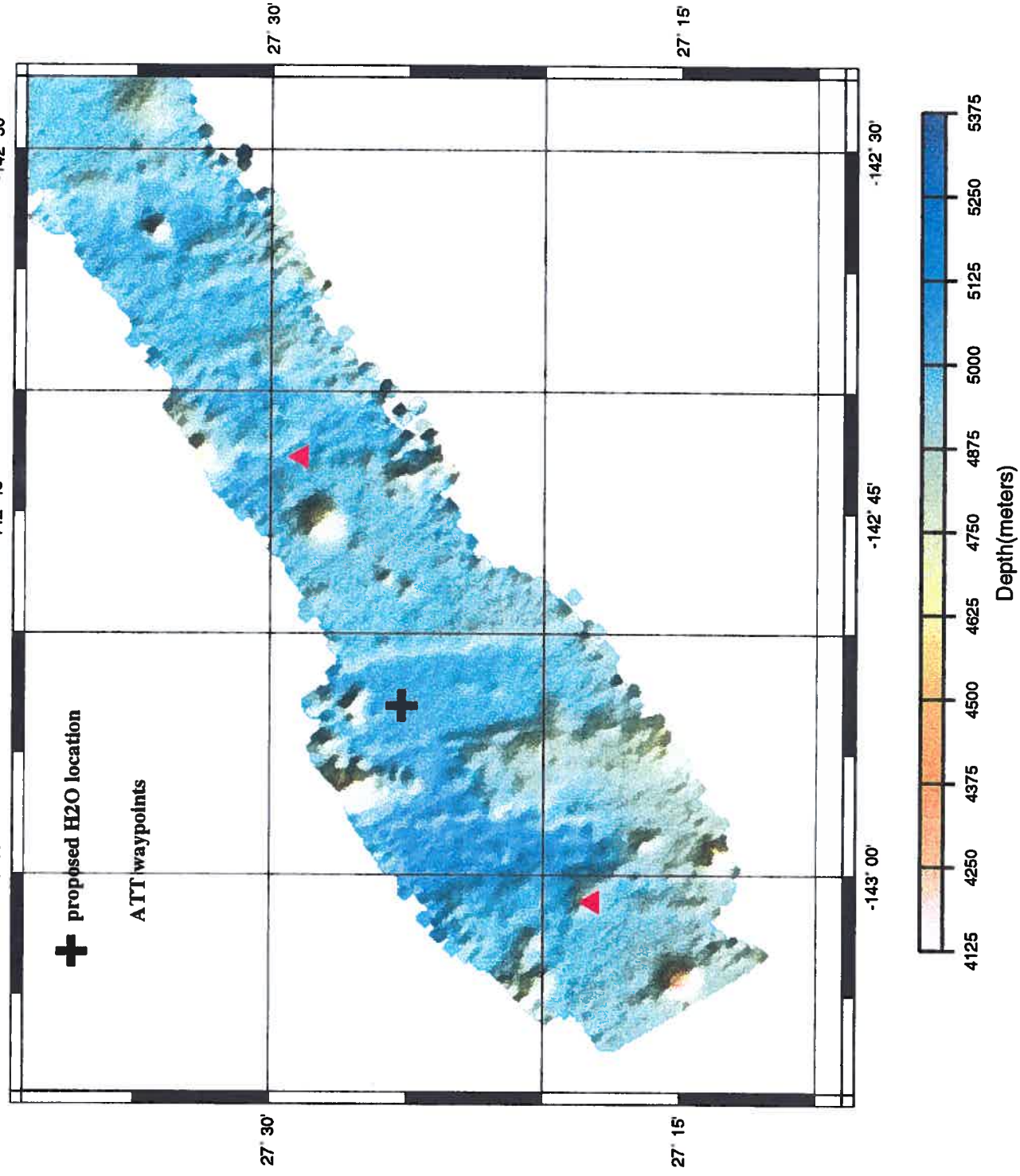

Figure 6a Bathymetry -- H2O Site NICK

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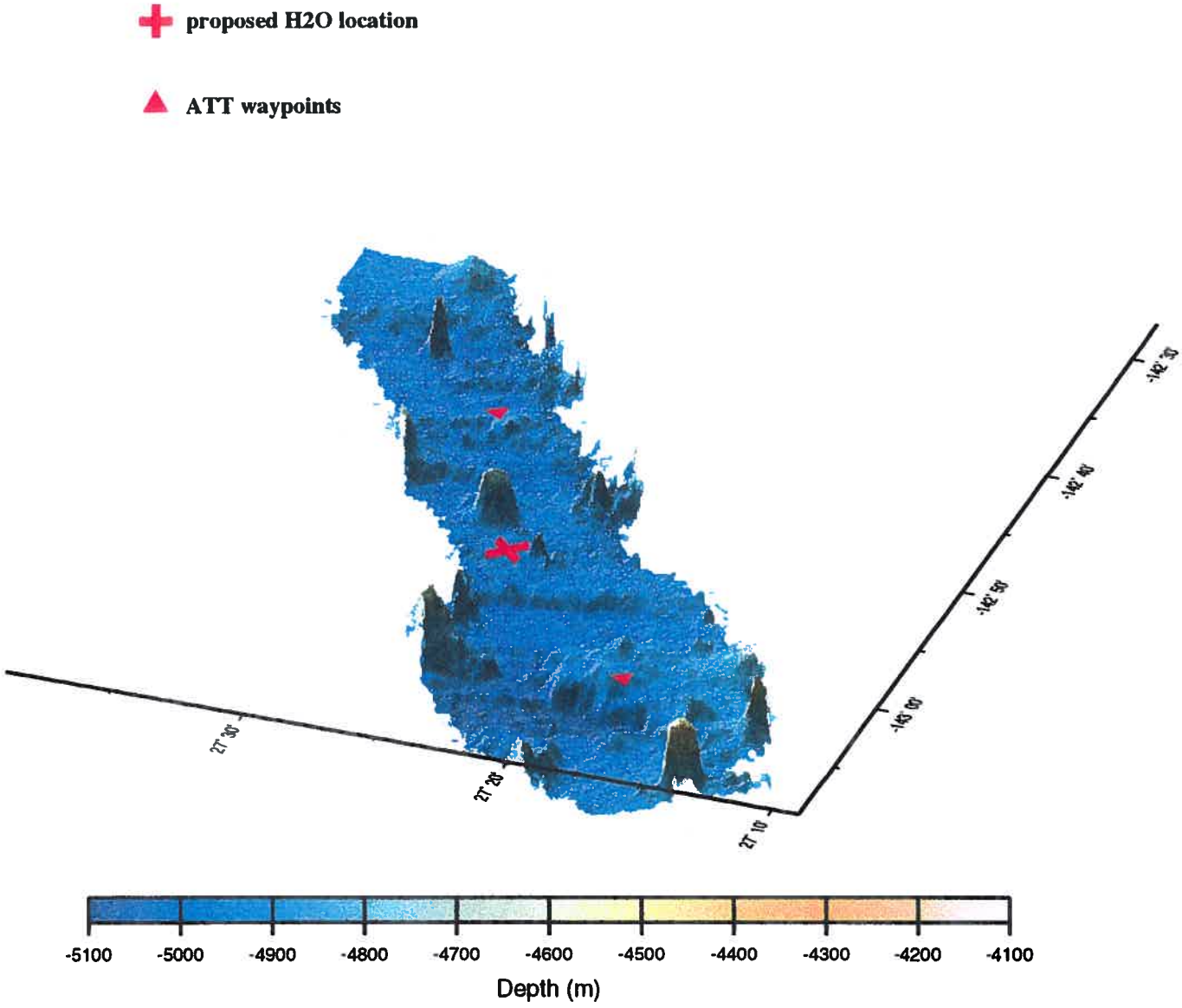
Figure 6b: Bathymetry - H2O Site NICK



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it originally passed the array with a negative sign and will add to the negative tail. The result will be a three peaked pulse with the central negative peak twice as large in amplitude as the positive first and third pulses. The total length of the wavelet will be about 30msec. The wavelet will consist of a period and a half of a 50Hz pulse. So let's assume that this is our incident pulse.

Figure 7 shows an unmigrated section of SCS profile from Site Sarah. The first three positive (black) arrivals are separated by about 30msec! Since we think that the complete source wavelet is only 30msec long, this suggests that each arrival corresponds to a reflection event.

We interpret the first reflection to be the seafloor, the second reflection to be a mid-sediment reflector, perhaps a chert layer, and the third reflection to be the basement-sediment contact. The notion that these three arrivals are not all contained in the incident field is supported by the observation that their separation is constant over flat regions but varies from region to region. For example the first layer is half as thick on the left (at about 229-1400) as it is on the right (at about 229-1330). So for the moment we are interpreting the sediment-basement to correspond to the third arrival.

Two deeper, lower frequency arrivals are interpreted to be peg-leg multiples between the basement and the inter-sediment reflector. The inter-sediment reflector is large amplitude because it is occurring at something hard like chert or limestone. The 3.5Khz profiling data also show a smooth reflector about 10-20m below the seafloor. We interpret these as the same reflector.

This interpretation is summarized in Figure 8, a migrated version of the data in Figure 7. Many small scale features such as faults, uneven deposition rates, sediment scour, etc can be interpreted in these sections. Some faults occur in basement and are draped in sediment. These occurred early in the formation of the crust at the ridge. However other faults penetrate cleanly through basement and the full sediment column indicating that they correspond to recent faulting in a mid-plate environment.

At Site Sarah we have 11 parallel lines separated by 1.2nm and a single orthogonal tie line. The detailed structure of basement that these provide should permit us to select a drill site in an optimum location, say in the middle of a block, away from faulting and talus.

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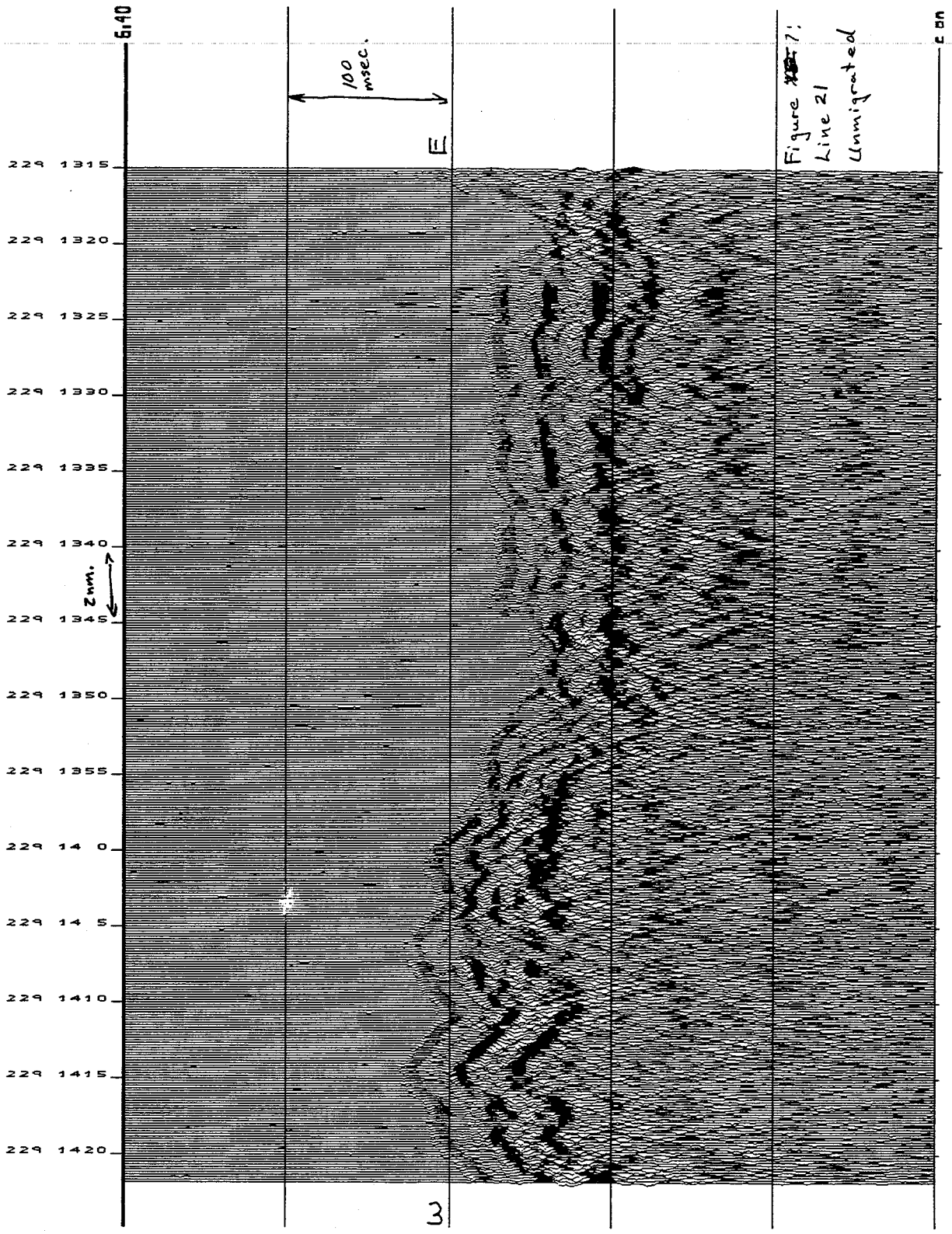
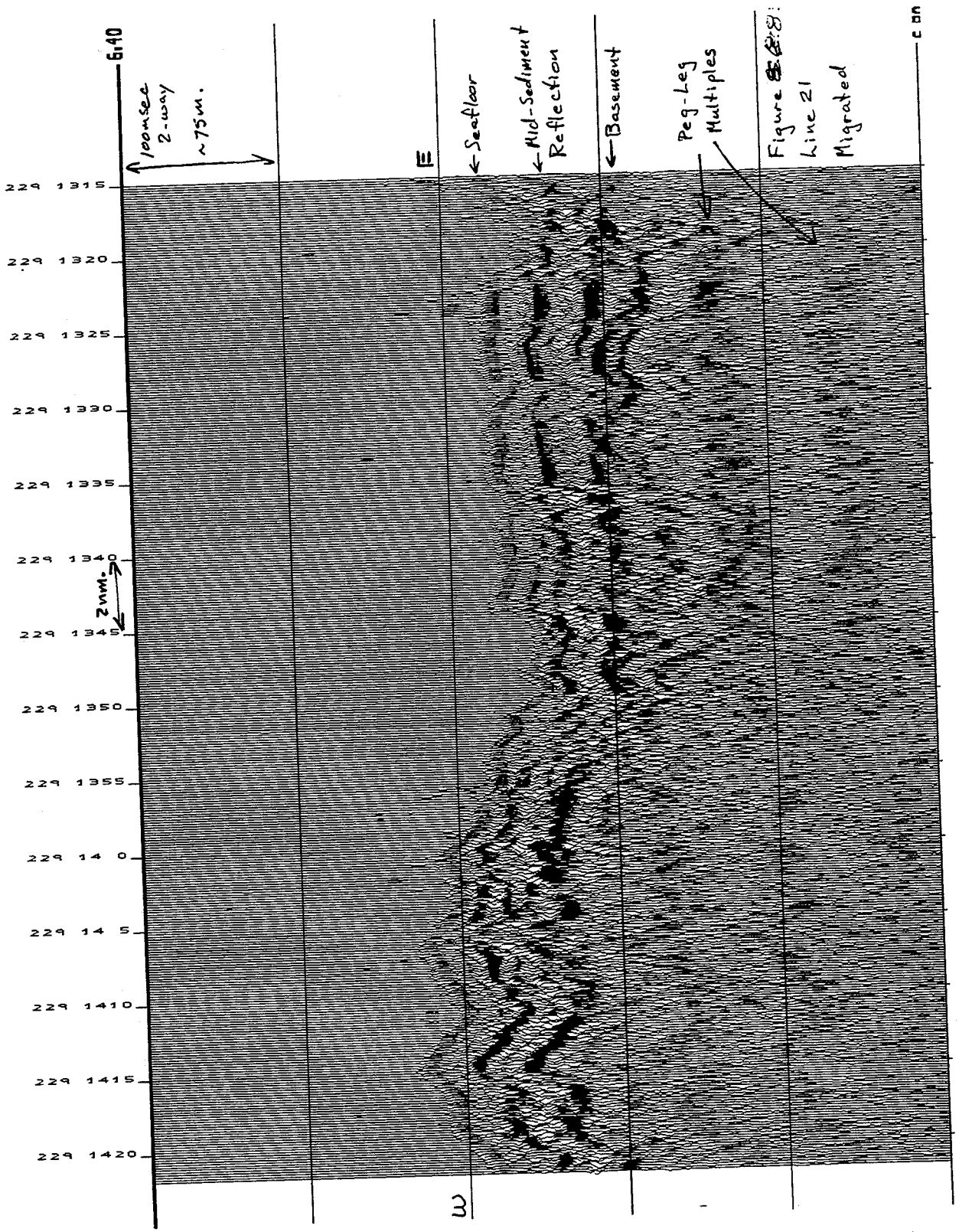

6:40
100 msec.
E
Figure 7: Line 21 Unmigrated
2 cm
229 1315
229 1320
229 1325
229 1330
229 1335
229 1340
2 nm.
229 1345
229 1350
229 1355
229 14 0
229 14 5
229 1410
229 1415
229 1420
3

21


6140
1000sec
2-way
~75m.
E
Seafloor
Mid-Sediment
Reflection
Basement
Peg-Leg
Multiples
Figure
Line 21
Migrated
229 1315
229 1320
229 1325
229 1330
229 1335
229 1340
2mm.
229 1345
229 1350
229 1355
229 14 0
229 14 5
229 1410
229 1415
229 1420
W

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Unfortunately 100msec two-way time corresponds to 75 m thickness at water velocity. Sediment velocities could be higher by about 10% giving about a 10% increase in thickness. However the third reflector occurs about 75msec after the seafloor reflection indicating only about 50 to 75m of sediment.

Further Work

A major challenge in the SCS data is to resolve the sediment-basement contact within the reflected pulse from the seafloor. Even though the Gas Injection Gun had a single spike with about 50Hz period, the effect of the sea surface above the gun and the receiver array creates a broader pulse incident on the seafloor. We could only change the depth of the guns and receivers by changing ship's speed. We tested speeds from 4 to 10knots but did not get an appreciable change in the duration of the pulse. We recommend that some processing be carried out to try to resolve a basement reflector. We suggest trying different filter bandwidths, deconvolution, and more careful migration.

We were unable to process the digital 3.5KHz data at sea because of an error message from the SIOSEIS code. This should be pursued. The 3.5KHz data can be processed similarly to the SCS data and should have inherently better resolution for thin sediment layers. The shipboard analog displays show a continuous reflector about 10-20m below the seafloor reflection. We do not think that this is basement. With further processing we should see below the reflector.

Acknowledgements

We express our gratitude to Captain Desjardins and the officers and crew of the R/V Roger Revelle for a very pleasant and comfortable cruise. We would also like to thank Jim Charters and Seth Mogk for their technical assistance in acquiring the geophysical data on the leg. This work was carried out under the JOI Prime Contract OCE-93020477, JOI Budget Code 44505-J13010.

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Potential H2O Observatory Sites
(in order of priority)

Site Sarah	27°59.4'N	140°50.5'W
Site Emily	28°37.4'N	140°23.1W
Site Nick	27°25.2N	140°53.0'W

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Cruise Summary

	Time(JD-GMT)	Duration (h:m)
Depart San Francisco	223-2140	
Transit (SEABEAM only)		38:50
Join Cable at 130°W ATTWP#180	225-1230	
Spec Survey (SEABEAM and magnetometer)		37:10
Guns in Water for Testing ATTWP#140	227-0140	
Testing		10:50
Start Seismic Survey of Cable at 140°0'W ATTWP#134	227-1230	
Cable Survey (SEABEAM, SCS,..)		4:50
Stop Seismic Survey of Cable at 140°40'W ATTWP#131	227-1740	
Transit		1:35
Start Survey Emily	227-1915	
Site Survey(SEABEAM, SCS,..)		16:00
End Survey Emily	228-1115	
Transit		1:45

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Cruise Summary, cont'd

	Time(JD-GMT)	Duration (h:m)
Start Seismic Survey of Cable at 140°40'W ATTWP131	228-1300	
Cable Survey (SEABEAM, SCS,..)		12:00
Stop Seismic Survey of Cable at 142°06'W ATTWP122	229-0100	
Transit		1:15
Start Survey Sarah	229-0215	
Site Survey(SEABEAM, SCS,..)		15:45
End Survey Sarah	229-1800	
Transit		2:00
Start Seismic Survey of Cable at 142°06'W ATTWP122	229-2000	
Cable Survey (SEABEAM, SCS,..)		7:30
Stop Seismic Survey of Cable at 143°W ATTWP119	230-0330	
Start Survey Nick	230-0330	
Site Survey(SEABEAM, SCS,..)		6:30
End Survey Nick Guns out of the water	230-1000	

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Cruise Summary, cont'd

	Time(JD-GMT)	Duration (h:m)
Spec Survey (SEABEAM and magnetometer)		59:10
Leave cable at 155°W	232-2110	
Transit		20:50
Arrive Honolulu	233-1800	

Totals

Cable Survey (SEABEAM, SCS,..)	24:20
Site Survey(SEABEAM, SCS,..)	38:15
Spec Survey (SEABEAM and magnetometer)	96:20
Testing	10:50
Transit	66:15
Total Cruise	236:00

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DATA SUMMARY

SEABEAM - H2O Site (227-1130 to 230-1000)	- 69:30
- Spec Data -	- 96:20
Magnetometer - H2O Site (227-1130 to 230-1000)	- 69:30
- Spec Data -	- 96:20
3.5KHz Echo Sounder	
- Digital - H2O Site (227-1130 to 230-1000)	- 69:30
- on paper - Spec Data -	- 96:20
Single Channel Seismic - ran gun for	- 80:20
- acquired digital data	- 31:45
Navigation - whole cruise	-236:00

EPC Records - SCS
SEABEAM
3.5KHz

Calcomp Pages of SEABEAM Data

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PARTICIPATING SCIENTISTS

Ralph Stephen, WHOI - Chief Scientist
- 0800-1200 and 2000-2400L watches

Steve Swift, WHOI - Research Specialist
- 0000-0400 and 1200-1600L watches

Bob Greaves, MIT/WHOI - Graduate Student
-0400-0800 and 1600-2000L watches

Seth Mogk, SIO - Geophysics Technician

Bob Williams, SIO - Guest Scientist

Julian Day Summary

August 11 - JD 223
August 12 - JD 224
August 13 - JD 225
August 14 - JD 226
August 15 - JD 227
August 16 - JD 228
August 17 - JD 229
August 18 - JD 230
August 19 - JD 231
August 20 - JD 232
August 21 - JD 233

Time Zone Summary

GMT	0000	
Boston (Daylight Time)	2000	+4
San Francisco (Daylight Time)	1700	+7
Honolulu	1400	+10

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Appendix A: List of Way Point Numbers for ATT-Hawaii-2 Cable

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Lat Long Nau2.dat

1	21	29.05	-158	-13.48			1				Makaha Terminal L
and Section NPAC 0712											
2	21	28.82	-158	-13.45		L4	1		0.190	0.190	Beach Splice L4-1
C. & G.S. 4110											
3	21	28.35	-158	-13.93			1				HAW-CAL III 1974
Crossings - Note 1											
4	21	28.35	-158	-13.85	18	L5	1				A/C
5	21	28.43	-158	-14.88	229	L5	1		1.500	1.690	Splice L5-L3 Fact
ory Splice											
6	21	28.75	-158	-15.25	215	L3	1		0.600	2.290	First Splice L3-1
Start Lay Long Lines 5-27-64											
7	21	28.90	-158	-15.55		L3	1		0.400	2.690	Splice L3-L3
8	21	29.00	-158	-15.85	305	L3	1		0.330	3.020	Junction Box L3-1
9	21	29.05	-158	-16.63			1				HAW-JHTH IS 1966
Crossings - Note 2 **?**											
10	21	29.10	-158	-17.85			1				HAW-FIJI 1963 Cro
ssings - Note 3											
11	21	29.10	-158	-18.30	720	L1	1				A/C
12	21	29.75	-158	-19.16			1				AMZCAN 1963 Cross
ings - Note 4											
13	21	29.00	-158	-19.80	1015	L1	1				
14	21	28.20	-158	-25.00	1300	L1	1	11.940	8.920	11.940	R-1 A/C
15	21	28.70	-158	-30.50	1410	L1	2		5.010	16.950	A/C
16	21	29.00	-158	-36.30	1140	L1	2				A/C
17	21	29.00	-158	-40.00			2				H10-HONOLULU 1903
Crossings - Note 5											
18	21	29.00	-158	-40.40	1545	L1	2		9.960	26.910	A/C
19	21	29.30	-158	-42.30		L1	2				A/C
20	21	31.20	-158	-45.40	2315	L1	2	20.250	5.280	32.190	R-2
21	21	37.50	-158	-56.70	2185	L1	3		12.690	44.880	A/C
22	21	38.90	-158	-58.10	2140	L1	3		2.320	47.200	A/C
23	21	41.00	-159	0.00		L1	3				A/C
24	21	42.80	-159	-1.30	1970	L1	3	20.070	5.060	52.260	R-3 A/C
25	21	43.67	-159	-1.70			4				H10-HONOLULU 1903
Crossings - Note 6											
26	21	47.20	-159	-2.20	1785	L1	4		5.000	57.260	A/C
27	21	50.50	-159	-3.70		L1	4				A/C
28	21	54.70	-159	-2.80		L1	4		8.570	65.830	A/C
29	22	0.50	-159	-0.60	1675	L1	4	20.140	6.570	72.400	R-4 A/C
30	22	15.20	-158	-55.10	2100	L1	5				A/C
31	22	16.67	-158	-51.35			5				PT ALB-HAW 1963 C
rossings - Note 7											
32	22	16.80	-158	-51.10	2310	L1	5	20.120	20.120	92.520	R-5
33	22	23.10	-158	-32.00	2620	L1	6	20.170	20.170	112.690	R-6
34	22	28.90	-158	-10.70	2500	L1	7	20.110	20.110	132.800	R-7
35	22	31.00	-158	-3.00	2565	L1	8		9.060	141.860	A/C
36	22	36.50	-157	-50.80	2545	L1	8	20.140	11.080	152.940	R-8
37	22	44.70	-157	-31.10	2460	L1	9	20.040	20.040	172.980	R-9 **?**
38	22	52.30	-157	-11.90	2375	L1	10	20.180	20.180	193.160	R-10
39	22	54.60	-157	-6.00	2350	L1	11a	6.040	6.040	199.200	E-1
40	22	57.00	-157	-0.00	2330	L1	11b	6.040	6.040	6.040	R-11
41	22	58.90	-156	-55.70	2320	L1	12		5.000	11.040	A/C
42	23	0.60	-156	-50.60	2310	L1	12		4.430	15.470	A/C
43	23	7.10	-156	-41.80	2290	L1	12	20.090	10.660	26.130	R-12 WPAC 0610 *
*?**											
44	23	19.70	-156	-25.20	2260	L1	13	20.040	20.040	46.170	R-13
45	23	20.20	-156	-24.20		L1	14				A/C
46	23	26.20	-156	-14.00		L1	14		12.710	58.880	A/C
47	23	29.20	-156	-7.70	2270	L1	14	20.050	7.340	66.220	R-14
48	23	36.50	-155	-47.00	2310	L1	15	20.040	20.040	86.260	R-15
49	23	42.90	-155	-30.00	2310	L1	16		18.580	104.840	A/C
50	23	43.60	-155	-28.60	2310	L1	16	20.040	1.460	106.300	R-16
51	23	51.70	-155	-6.00	2380	L1	17	20.100	20.100	126.400	R-17
52	24	0.00	-154	-46.30	2445	L1	18	20.040	20.040	146.440	R-18
53	24	3.20	-154	-42.80	2370	L1	19		5.920	152.360	A/C
54	24	10.20	-154	-29.60	2550	L1	19	20.030	14.110	166.470	R-19

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55	24	11.00	-154	-28.50		L1	20		1.500	167.970	Splice L1-L1
56	24	16.00	-154	-21.20		L1	20		12.440	180.410	Splice L1-L1 Long
Lines 5-29-64 Start Lay 2											
57	24	17.00	-154	-20.00		L1	20		3.370	183.780	Splice L1-L1
58	24	18.20	-154	-17.90	2580	L1	20	20.110	2.800	186.580	R-20
59	24	22.20	-154	-13.50	2610	L1	21a	6.040	6.040	192.620	E-2
60	24	26.10	-154	-8.90	2620	L1	21b	6.040	6.040	6.040	R-21
61	24	30.00	-154	-3.20	2660	L1	22		6.910	12.950	A/C
62	24	35.90	-153	-50.80	2670	L1	22	20.110	13.200	26.150	R-22
63	24	42.00	-153	-30.60	2770	L1	23	20.180	20.180	46.330	R-23
64	24	47.20	-153	-10.00	2835	L1	24	20.120	20.120	66.450	R-24 WPAC 0609 *
*?**											
65	24	52.50	-152	-47.80	2830	L1	25	20.140	20.140	86.590	R-25
66	24	52.90	-152	-42.10	2845	L1	26		5.050	91.640	A/C
67	25	1.60	-152	-20.50	2910	L1	26	20.100	15.050	106.690	R-26
68	25	13.00	-152	-11.20	2800	L1	27	20.110	20.110	126.800	R-27
69	25	16.00	-152	-7.70	2870	L1	28		5.130	131.930	A/C
70	25	18.20	-152	-3.90	2895	L1	28		3.880	135.810	A/C
71	25	15.70	-151	-56.30			28				HAW-CALIF 1 1957
Crossings - Note 8											
72	25	14.80	-151	-53.50	2915	L1	28	20.120	11.110	146.920	R-28
73	25	13.80	-151	-50.50		L1	29				A/C
74	25	21.00	-151	-35.10	2860	L1	29	20.130	20.130	167.050	R-29
75	25	30.00	-151	-12.80	2880	L1	30	20.070	20.070	187.120	R-30
76	25	32.80	-151	-7.10	2880	L1	31a	6.040	6.040	193.160	E-3
77	25	34.90	-151	-1.90	2905	L1	31b	6.030	6.030	6.030	R-31
78	25	36.30	-150	-56.60	2895	L1	32		5.120	11.150	A/C MH5 **?**
79	25	37.70	-150	-51.40	2860	L1	32		5.000	16.150	A/C MH10 **?**
80	25	39.90	-150	-46.10	2880	L1	32		5.000	21.150	A/C MH15 **?**
81	25	41.50	-150	-41.00	2915	L1	32	20.120	5.000	26.150	R-32 A/C
82	25	40.00	-150	-21.60			33				HAW-CALIF 1 1957
Crossings - Note 9											
83	25	39.90	-150	-19.90	2870	L1	33	20.030	20.030	46.180	R-33
84	25	37.90	-149	-58.50	2850	L1	34	20.140	20.140	66.320	R-34
85	25	36.00	-149	-37.20	2830	L1	35	20.110	20.110	86.430	R-35
86	25	34.60	-149	-22.40	2840	L1	36		14.220	100.650	A/C
87	25	35.60	-149	-15.90	2880	L1	36	20.190	5.970	106.620	R-36 WPAC 0808 *
*?**											
88	25	36.00	-149	-18.60			37				SF-HONOLULU 1903
Crossings - Note 10											
89	25	37.80	-149	-2.80		L1	37				A/C
90	25	41.30	-148	-55.00	2785	L1	37	20.120	20.120	126.740	R-37
91	25	41.80	-148	-54.20		L1	38				A/C
92	25	46.20	-148	-35.00	2860	L1	38	20.130	20.130	146.870	R-38
93	25	51.30	-148	-13.90	2895	L1	39	20.130	20.130	167.000	R-39 A/C
94	25	52.00	-147	-52.50	2820	L1	40	20.070	20.070	187.070	R-40
95	25	52.20	-147	-51.10		L1	41a				A/C
96	25	52.70	-147	-46.10	2800	L1	41a	6.060	6.060	193.130	E-4
97	25	53.70	-147	-39.60	2855	L1	41b	6.080	6.080	6.080	R-41
98	25	56.90	-147	-18.20	2820	L1	42	20.130	20.130	26.210	R-42
99	25	58.30	-147	-8.00	2790	L1	43		10.050	36.260	A/C
100	25	59.30	-147	-4.00			43				BAHF-FA IS 1926 C
rossings - Note 11 **?**											
101	26	1.20	-146	-57.30	2770	L1	43	20.050	10.000	46.260	R-43
102	26	6.20	-146	-36.50	2730	L1	44	20.080	20.080	66.340	R-44 **?**
103	26	12.50	-146	-15.90	2690	L1	45	20.140	20.140	86.480	R-45 WPAC 0907
104	26	14.20	-146	-10.73			46				BAHF-FA IS 1902 C
rossings - Note 12 **?**											
105	26	19.00	-145	-55.70	2670	L1	46	20.090	20.090	106.570	R-46
106	26	22.10	-145	-44.70	2740	L1	47		8.210	114.780	A/C
107	26	23.30	-145	-39.30		L1	47			-	A/C
108	26	24.10	-145	-34.30	2740	L1	47	20.060	11.850	126.630	R-47
109	26	27.30	-145	-12.80	2720	L1	48	20.100	20.100	146.730	R-48
110	26	30.30	-144	-51.20	2750	L1	49	20.070	20.070	166.800	R-49 A/C
111	26	39.80	-144	-31.80	2650	L1	50	20.120	20.120	186.920	R-50
112	26	42.60	-144	-26.00	2560	L1	51a	6.060	6.060	192.980	E-5

33

	Lat		Long									
	deg	min	deg	min								
113	26	45.30	-144	-20.20	2605	L1	51b	6.040	6.040	6.040	R-51	
114	26	54.42	-144	-0.90	2515	L1	52	20.160	20.160	26.200	R-52	
115	27	0.00	-143	-50.50		L1	53				A/C	
116	27	3.00	-143	-41.20	2600	L1	53	20.040	20.040	46.240	R-53	
117	27	9.50	-143	-21.00	2545	L1	54	20.060	20.060	66.300	R-54	
118	27	13.00	-143	-10.20	2565	L1	55		10.150	76.450	A/C	
119	27	18.20	-143	-1.10	2610	L1	55	20.130	9.980	86.430	R-55	
120	27	28.90	-142	-42.70	2650	L1	56	20.120	20.120	106.550	R-56	
121	27	39.50	-142	-24.00	2600	L1	57	20.030	20.030	126.580	R-57	
122	27	49.70	-142	-6.30	2665	L1	58		19.100	145.680	A/C	
123	27	50.30	-142	-5.30	2675	L1	58	20.100	1.000	146.680	R-58	WPAC 0906 *
*?**												
124	28	1.40	-141	-47.80	2625	L1	59	20.030	20.030	166.710	R-59	
125	28	11.70	-141	-30.00	2605	L1	60	20.060	20.060	186.770	R-60	
126	28	11.90	-141	-29.80		L1	61a				A/C	
127	28	15.60	-141	-25.00	2600	L1	61a	6.050	6.050	192.820	E-6	
128	28	19.30	-141	-19.70	2490	L1	61b	6.050	6.050	6.050	R-61	
129	28	31.40	-141	-3.00	2550	L1	62	20.110	20.110	26.160	R-62	
130	28	32.00	-141	-2.00	2540	L1	63		1.250	27.410	A/C	
131	28	33.80	-140	-41.30	2590	L1	63	20.050	18.800	46.210	R-63	
132	28	33.90	-140	-28.60	2575	L1	64		11.350	57.560	A/C	
133	28	38.80	-140	-21.00	2550	L1	64	20.060	8.710	66.270	R-64	
134	28	50.10	-140	-3.10	2535	L1	65	20.150	20.150	86.420	R-65	
135	29	1.10	-139	-46.20	2545	L1	66		19.360	105.780	A/C	
136	29	1.30	-139	-45.40	2560	L1	66	20.060	0.700	106.480	R-66	WPAC 1005
137	29	7.50	-139	-24.60	2560	L1	67	20.140	20.140	126.620	R-67	
138	29	13.20	-139	-3.80	2400	L1	68	20.100	20.100	146.720	R-68	
139	29	18.70	-138	-42.60	2510	L1	69	20.250	20.250	166.970	R-69	
140	29	22.00	-138	-30.00	2445	L1	70				A/C	
141	29	26.20	-138	-22.90	2480	L1	70	20.110	20.110	187.080	R-70	
142	29	29.50	-138	-17.20	2510	L1	71a	6.040	6.040	193.120	E-7	
143	29	32.80	-138	-11.80	2430	L1	71b	6.070	6.070	6.070	R-71	
144	29	41.70	-137	-56.20	2520	L1	72		17.140	23.210	A/C	
145	29	42.90	-137	-53.20	2550	L1	72	20.130	2.990	26.200	R-72	
146	29	51.00	-137	-35.50		L1	73				A/C	
147	29	50.90	-137	-33.70	2475	L1	73	20.170	20.170	46.370	R-73	
148	29	50.90	-137	-12.10	2400	L1	74	20.120	20.120	66.490	R-74	
149	29	50.90	-136	-50.00	2540	L1	75	20.030	20.030	86.520	R-75	
150	29	50.90	-136	-46.00	2530	L1	76		2.210	88.730	A/C	
151	29	58.40	-136	-29.10	2480	L1	76	20.170	17.960	106.690	R-76	**?**
152	30	6.00	-136	-10.00	2430	L1	77	20.040	20.040	126.730	R-77	A/C
153	30	17.10	-135	-52.00	2390	L1	78	20.030	20.030	146.760	R-78	
154	30	27.90	-135	-34.00	2340	L1	79	20.160	20.160	166.920	R-79	
155	30	35.80	-135	-21.70	2515	L1	80		14.140	181.060	A/C	
156	30	37.40	-135	-14.70	2545	L1	80	20.130	5.990	187.050	R-80	
157	30	39.20	-135	-8.20	2400	L1	81a	6.050	6.050	193.100	E-8	**?**
158	30	40.60	-135	-3.50		L1	81b		4.570	4.570	A/C	
159	30	41.20	-135	-2.00	2500	L1	81b	6.060	1.490	6.060	R-81	
160	30	49.10	-134	-46.00	2640	L1	82				A/C	
161	30	49.80	-134	-42.20	2510	L1	82	20.130	20.130	26.190	R-82	
162	30	54.10	-134	-20.70	2620	L1	83	20.210	20.210	46.400	R-83	
163	30	58.70	-133	-59.10	2570	L1	84	20.100	20.100	66.500	R-84	
164	31	3.00	-133	-38.00	2490	L1	85	20.140	20.140	86.640	R-85	
165	31	5.00	-133	-29.50		L1	86		7.180	93.820	A/C	
166	31	10.80	-133	-17.20	2510	L1	86	20.160	12.980	106.800	R-86	
167	31	20.00	-132	-57.40	2490	L1	87	20.070	20.070	126.870	R-87	
168	31	29.40	-132	-37.20	2530	L1	88	20.180	20.180	147.050	R-88	
169	31	38.80	-132	-17.20	2465	L1	89	20.150	20.150	167.200	R-89	
170	31	48.00	-131	-57.20	2480	L1	90	20.060	20.060	187.260	R-90	
171	31	50.80	-131	-51.20	2410	L1	91a	6.070	6.070	193.330	E-9	
172	31	51.70	-131	-49.80	2500	L1	91b		1.580	1.580	A/C	**?**
173	31	53.00	-131	-44.90	2430	L1	91b	6.040	4.460	6.040	R-91	
174	31	56.30	-131	-22.90	2420	L1	92	20.170	20.170	26.210	R-92	
175	32	3.70	-131	-1.20	2400	L1	93	20.150	20.150	46.360	R-93	WPAC 1103 *
*?**												
176	32	5.10	-130	-54.30		L1	94		6.810	53.170	A/C	

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177	32	10.60	-130	-40.20	2435	L1	94	20.090	13.280	66.450	R-94	
178	32	14.40	-130	-30.00	2430	L1	95		10.120	76.570	A/C	
179	32	18.60	-130	-18.90	2350	L1	95	20.130	10.010	86.580	R-95	
180	32	26.50	-129	-59.50	2355	L1	96	20.090	20.090	106.670	R-96	
181	32	34.40	-129	-39.00	2315	L1	97	20.180	20.180	126.850	R-97	
182	32	42.20	-129	-19.20	2400	L1	98	20.100	20.100	146.950	R-98	
183	32	50.40	-128	-58.10	2440	L1	99	20.190	20.190	167.140	R-99	
184	32	57.50	-128	-39.80		L1	100				A/C	
185	32	58.40	-128	-37.00	2425	L1	100	20.160	20.160	187.300	R-100	
186	33	0.50	-128	-30.50	2480	L1	101a	6.040	6.040	193.340	E-10	
187	33	2.70	-128	-24.00	2430	L1	101b	6.020	6.020	6.020	R-101	
188	33	7.90	-128	-8.80	2410	L1	102		13.640	19.660	A/C	
189	33	10.30	-128	-2.00	2380	L1	102	20.170	6.530	26.190	R-102	
190	33	17.90	-127	-41.50	2430	L1	103	20.150	20.150	46.340	R-103	
191	33	25.40	-127	-21.40	2380	L1	104	20.090	20.090	66.430	R-104	
192	33	32.00	-127	-1.10	2350	L1	105	20.140	20.140	86.570	R-105	WPAC 1102
193	33	33.00	-127	0.00		L1	106		1.300	87.870	A/C	
194	33	42.60	-126	-42.00	2410	L1	106	20.190	18.890	106.760	R-106	
195	33	48.70	-126	-30.00	2530	L1	107				A/C	
196	33	51.00	-126	-22.00	2510	L1	107	20.200	20.200	126.960	R-107	
197	33	57.50	-126	-0.80	2470	L1	108	20.190	20.190	147.150	R-108	
198	34	3.10	-125	-43.10		L1	109				A/C	
199	34	3.60	-125	-39.40	2490	L1	109	20.120	20.120	167.270	R-109	
200	34	7.20	-125	-17.40	2455	L1	110	20.150	20.150	187.420	R-110	
201	34	8.10	-125	-11.00	2440	L1	111a	6.040	6.040	193.460	E-11	
202	34	9.20	-125	-3.80	2430	L1	111b	6.040	6.040	6.040	R-111	
203	34	11.00	-124	-53.10		L1	112				A/C	
204	34	13.80	-124	-47.20	2390	L1	112		15.120	21.160	A/C	
205	34	15.30	-124	-41.90	2390	L1	112	20.130	5.010	26.170	R-112	
206	34	21.80	-124	-20.00	2360	L1	113	20.130	20.130	46.300	R-113	
207	34	28.10	-123	-58.10	2310	L1	114	20.140	20.140	66.440	R-114	
208	34	33.90	-123	-35.60	2300	L1	115	20.150	20.150	86.590	R-115	
209	34	34.90	-123	-30.00	2235	L1	116		5.080	91.670	A/C	
210	34	39.20	-123	-14.40	2180	L1	116	20.080	15.000	106.670	R-116	
211	34	42.00	-123	-6.00		L1	117				A/C	
212	34	42.00	-122	-52.90	2200	L1	117	20.120	20.120	126.790	R-117	WPAC 1101
213	34	42.00	-122	-38.80		L1	118				A/C	
214	34	44.70	-122	-31.00	2060	L1	118	20.070	20.070	146.860	R-118	
215	34	47.60	-122	-13.00	2150	L1	119		17.610	164.470	A/C	
216	34	48.90	-122	-10.10	2150	L1	119	20.190	2.580	167.050	R-119	
217	34	59.50	-121	-51.80	1230	L1	120	20.120	20.120	187.170	R-120	**?**
218	35	2.90	-121	-46.20	1040	L1	121	6.050	6.050	193.220	E-12	
219	35	6.10	-121	-41.30	760	L1	121b				A/C	
220	35	6.47	-121	-41.44	735	L1	121b	6.040	6.040	6.040	R-121	
221	99	99.99	-999	-99.99		L1	121A		1.014	7.054	Splice SDL1-SFL1	
Ship Splice CHARLES L. BROWN												
222	99	99.99	-999	-99.99		L1	121A		5.305	12.359	Splice SFL1-SDL1	
Ship Splice CHARLES L. BROWN												
223	35	12.39	-121	-44.10	715	L1	121A		0.751	13.110	First SPL SDL1-SDL	
1 CHARLES L. BROWN 12-6-87												
224	35	13.62	-121	-42.50	660	L1	121A		2.058	15.168	Final SPL SDL1-SFL	
1 CHARLES L. BROWN 12-6-87												
225	35	14.70	-121	-42.60	660		121A				A/C	
226	99	99.99	-999	-99.99		L1	121A		2.660	17.828	Splice SFL1-SFL1	
Ship Splice CHARLES L. BROWN												
227	35	17.97	-121	-42.13	570	L1	121A		1.609	19.437	Splice SFL1-SDL1	
Ship Splice CHARLES L. BROWN												
228	99	99.99	-999	-99.99		L1	121A		6.295	25.732	Splice SDL1-SDL1	
Ship Splice CHARLES L. BROWN												
229	99	99.99	-999	-99.99		L1	121A		1.436	27.168	Splice SDL1-SDL1	
Ship Splice CHARLES L. BROWN												
230	35	23.00	-121	-38.48	605		121A				A/C	
231	99	99.99	-999	-99.99		L1	121A		1.304	28.472	Splice Ship Splic	
e CHARLES L. BROWN												
232	35	23.11	-121	-37.83	595	L1	121A	22.447	0.015	28.487	R-121A CHARLES L.	
BROWN 12-3-87												

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233	35	23.20	-121	-35.00	555		122				A/C
234	35	24.53	-121	-29.92	485		122				A/C
235	35	22.92	-121	-25.00	410		122				A/C
236	35	21.19	-121	-19.95	320		122				A/C
237	99	99.99	-999	-99.99	330	L1	122		20.066	48.553	Splice SDL1-SDL1
CHARLES L. BROWN 12-3-87											
238	35	19.04	-121	-19.30	330	L1	122	20.084	0.018	48.571	R-122
239	35	16.50	-121	-17.20		L1	123				A/C
240	35	16.20	-121	-16.70	305	L1	123		4.130	52.701	JUNCTION BOX L1-L3
241	35	17.40	-121	-11.50		L3	123				A/C
242	35	18.67	-120	-57.33	47	L3	123	20.180	16.050	68.751	R-123 C. & G.S. 5
302 & 5387 **?**											
243	35	18.70	-120	-56.75		L3	124				A/C
244	35	18.43	-120	-55.50		L3	124		2.040	70.791	Final Splice L3-L6
Long Lines 7-11-64											
245	35	18.13	-120	-54.00		L6	124		1.310	72.101	Splice L6-L5 Fact
ory Splice											
246	35	18.10	-120	-53.80		L5	124				A/C
247	35	17.65	-120	-52.65		L5	124		1.270	73.371	Beach Splice L5-L4
248	35	16.67	-120	-43.00		L4	124	13.470	8.850	82.221	San Luis Obispo Te
rm											

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Appendix B: Watch Log

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S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: 2 — SHIP: Roger Revelle — DATE (DAY, MO, YR): 12 Aug 97 — TIME ZONE (SHIP): +7 — CHECK OPERATIONS: 12 kHz [X] 3.5 kHz [✓] SEIS.Prof [ ] MAG [ ] GRAV [ ] SeaB [ ] — PAGE 1

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts — COMMENTS AND OBSERVATIONS
0210	1819			37	32.26	N	123	08.98	W		228	13.0		
0300	1759			37	25.42	N	123	18.61	W		225	13.2		Ralph on watch — Julian Day 224 - 12 Aug
0315	1730			37	27.5	N	123	22.61	W		225	13.2		SVP entered
0330	1701	6		37	20.85	N	123	24.98	W		225	13.4		
0345	1697			37	18.57	N	123	27.07	W		225	13.4		
0400	1681			37	16.37	N	123	30.32	W		225	13.0		
0415	1674			37	13.71	N	123	33.57	W		225	13.6		
0430	1662			37	11.71	N	123	36.16	W		225	13.1		
0445	1638			37	08.51	N	123	40.50	W		225	13.0		
0500	1639			37	07.19	W	123	42.48	W		225	13.2		
0515	1547			37	05.40	N	123	45.10	W		225	13.0		
0530	1539			37	02.06	N	123	48.52	W		225	13.0		
0545	1612			37	00.39	N	123	51.30	W		225	13.5		
0600	1730			36	58.28	N	123	54.10	W		227	13.1		
0615	1827			36	55.69	N	123	57.33	W		226	13.2		
0630	1827			36	53.08	N	124	00.39	W		227	13.0		
0645	1827			36	51.58	N	124	03.22	W		225	13.1		0655 Swift on watch JD 224 - 12 August
0700	1827			36	49.31	N	124	06.46	W		226	13.1		- noticed System State panel not active
0711				36	46.62	N	124	10.12	W		224	13.2		
0730	4010	9		36	44.92		124	12.67	W		228	13.4		- called Jim to ck SB decided to ignore problem
0745	4010	5		36	42.86		124	15.99	W		231	13.5		
0810	3951			36	40.84		124	13.30			230	13.4		
0815	3926			36	38.48		124	22.78			227	13.6		
0830	3904			36	36.31		124	25.81			226	13.8		0628 3.5 kHz Servant up trying to change scales.
0845	3753				33.45			29.01			225	13.9		
0910	3816				31.68			32.05			226	13.6		0900 3.5 pinging continuously 0910 called Jim rebooted 3.5
0915	4047				29.01			35.31			225	13.3		
0930	4138				26.82			38.52			225	13.1		
0945	4178				25.11			42.30			224	13.2		
1000	4227				23.41			46.09			227	13.2		
1015	4216	5			20.76			49.27			225	13.1		
1030	4301	1			17.85			51.48			212	13.3		
1045	4314	4		36	15.27		124	54.35			228	13.3		
1100	4418			36	12.95		124	57.28			227	12.9		1046 GREAVES on WATCH JD 224 8/12/97
1115	4468			36	10.41		125	00.29			228	13.5		WIND 10knots from E
1130	4499			36	08.20		125	03.57			227	12.7		

S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: 2 — SHIP: Roger Revelle — DATE (DAY, MO, YR): 12 Aug 97 — TIME ZONE (SHIP): +7 — CHECK OPERATIONS: 12 kHz [ ] 3.5 kHz [✓] SEIS.Prof [ ] MAG [ ] GRAV [ ] SeaB [✓] — PAGE 2

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts — COMMENTS AND OBSERVATIONS
1146	4419			36	05.34	N	125	07.57	W		227	12.5		JD 224
1210	4448			36	03.48		125	10.02			228	12.7		
1230	4310			36	01.08		125	13.34			227	12.6		NICE ROUND ODV 3.5 kHz + SEABEAM
1245	4312			35	58.71		125	16.48			227	13.2		
1300	4340			35	56.24		125	20.20			227	12.8		
1315	4316			35	53.69		125	22.81			225	12.8		
1330	4317			35	51.24		125	25.39			226	12.9		FLAT BOTTOM
1345	4309			35	49.48		125	28.68			227	13.2		Light outside / overcast
1400	4337			35	47.39		125	31.46			225	12.8		CALLED JIM (COMP TECH) FOR NEW CAL COMP PAPER
1415	4362			35	44.85		125	34.91			226	12.4		NEW CALCOMP PAPER (CTL 'L' in window
1430	4415			35	42.95		125	37.43			228	12.8		to fix Seabeam Lab Display)
1445	4416			35	40.57		125	40.57			227	12.5		
1500	4416			35	38.33		125	43.57			228	12.9		
1520	4416			35	36.20	N	125	46.40	W		226	12.3		Ralph on watch - calm, overcast
1524				35	33.18	N	125	50.56	W		226	12.5		- right EPC is off scale. - bug in SeaBeam software
														Rebooting SeaBeam to fix System State hang-up.
1545	4617			35	29.57	N	125	55.56	W		226	12.8		SeaBeam up + running again
1606	4617			35	27.42	N	125	57.55	W		190	12.7		- Making course change to move gauge plank (temporary)
1621	4617			35	24.05	W	125	59.09	W		231	13.1		System state window hangs up again
1630	4617			35	22.20	N	126	02.36	W		231	12.7		- ROLL BIAS PROBLEM
1637														Rebooting SeaBeam -
1650														SeaBeam running with 1 console - will bias looks better
1700	4619			35	18.38	W	126	05.58	W		226	12.9		
1711	4619			35	16.13	N	126	11.74	W		226	12.7		
														FIRE + BOAT DRILL
1810	4739			35	10.77	N	126	21.65	W		227	11.8		
1820	4619			35	07.93	N	126	25.49	W		227	12.6		Back on Track, Displays look good - running on 1 console
														Adjusted Sidescan plot. - Grey Scale 50-80
														-Line/ping = 2 8 m/pixel
1830	4700			35	06.54	W	126	27.94	W		225	12.9		
1845	4716			35	04.73	N	126	30.54	W		223	12.5		Swift on watch JD = 224 8/12/97
1901	4716			35	2.55		126	33.45			224	12.6		Turned down TVG ramp on 3.5
1915	4712	9		35	00.20		126	36.58			221	12.8		Calcomp Seam CT, 100 m color change
1930	4715	8		34	58.12		126	39.33			221	12.7		
1945	4715	7		34	55.89		126	42.24			223	12.4		
2000	4715	8		34	45.43		126	45.43			222	12.6		
					53.68									

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S.I.O. UNDERWAY WATCH LOG | CRUISE: Kiwi | LEG: 2 | SHIP: ROGER REVELLE | TIME ZONE (SHIP): | CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG | GRAV | SeaB ✓ | PAGE 3

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	MIN	N/S	LONGITUDE DEG	MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts COMMENTS AND OBSERVATIONS
2015	4176			34	51.48	N	126	48.59	W		226	12.6		JD 224 8-12-97
2030	4181			34	49.23		126	51.53			216	12.5		2035 3.5 pinging but screen is black.
2045	4166			34	46.73		126	54.27			217	12.9		2049 Imagelet Printer on 3.5 2056 recorder back on
2100	4818			34	44.08		126	57.25			228	13.1		
2117	4783			34	41.70		127	00.45			226	12.8		
2130	4876			34	39.79		127	3.30			229	12.8		
2146	4877			34	37.37		127	6.58			228	12.4		
2200	4943			34	35.47		127	9.27			229	13.2		
2215	4723			34	33.25		127	12.39			229	12.6		
2230	4816			34	30.81		127	15.63			225	12.8		
2245	4711			34	28.60		127	18.30			226	12.4		2250-2255 changed paper on plotter 16"/deg long
2300	4896			34	26.11		127	21.41			225	12.4		GREAVES ON WATCH / changed fixed gain on 3.5 kHz
2315	4859			34	23.95		127	24.11			226	13.0		for 30dB to 42dB
2330	4816			34	21.46		127	27.19			225	12.9		increased gain on 3.5kHz to 48 dB (upper limit)
2345	4897			34	19.27		127	30.12			226	12.9		NE SOUND VEL. PROFILE SUP#2
0000	4828			34	16.72		127	33.03			226	13.0		JD 225 8-13-97
0015	4676			34	14.43		127	35.72			226	12.9		
0030	4850			34	11.95		127	39.01			231	13.1		
0045	4720			34	09.80		127	42.16			231	13.0		look like deep gauge to one side
0100	4853			34	07.78		127	45.14			230	13.2		
0115	4752			34	04.94		127	48.37			231	13.2		
0130	4707			34	03.24		127	51.89			230	13.2		
0145	4674			34	01.29		127	54.82			233	12.9		
0200	4738			33	59.24		127	57.96			230	13.3		
0215	4694			33	57.03		128	01.28			228	13.1		
0230	4666			33	54.98		128	04.10			226	12.8		
0234														0234 STOPPED LOGGING SEABEAM DATA FOR
0235														0235 SEABEAM BACK ON
0245	4584			33	52.41		128	07.30			225	12.9		
0300	4659			33	50.40	N	128	10.08	W		225	13.0		Ralph on watch - JD 225 -0300 ☀ -clear, calm,
0315	4614			33	47.92		128	13.04			225	12.4		change grey scale to 30-100
0330	4688			33	45.68		128	16.06			227	13.2		change grey scale to 30-80
0345	4676			33	43.24	N	128	19.08	W		226	12.7		
0400	4725			33	40.95		128	22.17			225	13.2		change grey scale to 50-100
0415	4710			33	38.67		128	25.14			226	13.1		
0430	4714			33	36.34		128	27.95			225	13.1		change grey scale to 60-80
0445	4710			33	34.26		128	30.94			225	13.2		

GDC MARCH 1978 (rev DEC 1993)

S.I.O. UNDERWAY WATCH LOG | CRUISE: KIWI | LEG: 02 | SHIP: REVELLE | TIME ZONE (SHIP): +7 | DATE (DAY, MO. YR): 13 AUG 97 | CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG ✓ | GRAV ✓ | SeaB ✓ | PAGE 4

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	MIN	N/S	LONGITUDE DEG	MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts COMMENTS AND OBSERVATIONS
0515	4710			33	31.80	N	128	34.12	W		226	12.8		change scale 30-70
0545	4711			33	[illegible]	N	128	[illegible]	W		[illegible]	[illegible]		
0615	4512			33	27.31		128	39.88			225	12.9		change scale 50-70
0645	[illegible]			33	[illegible]		128	[illegible]			226	13.0		
0700	4319			33	22.75		128	[illegible]			[illegible]	[illegible]		change scale 50-70 BEGINS [illegible]
0715	4316			33	20.54		128	48.78			225	[illegible]		
0730	4428			33	18.02		128	[illegible]			225	13.0		
0745	4513			33	[illegible]		128	[illegible]			[illegible]	[illegible]		0750 changed paper on Calcomp Plotter. ETA C7 5:15
0710	4522			33	13.82	N	128	57.54	W		225	12.8		Swift on watch. 8-13-97 plotting 5 min. width
0715	4515			33	11.58		129	00.40			224	13.1		
0730	4707			33	9.33		129	3.29			225	12.8		
0745	4702			33	7.07		129	6.17			226	12.9		
0800	4315			33	4.80		129	9.06			226	12.7		
0815	4515			33	2.28		129	12.37			224	12.6		
0830	4578			33	00.35		129	14.91			225	13.0		
0845	4658		32	[illegible]	58.16		129	17.82			224	12.6		
0900	4632		32	[illegible]	55.82		129	20.94			225	13.2		
0915	4712			32	[illegible]		129	26.63			226	12.5		
0930	4518			32	51.53		129	26.71			225	12.9		0925 beginning of F2?
0945	3915			32	49.46		129	30.70			228	12.9		
1000	4428			32	46.98		129	33.12			228	13.0		
1015	4510			32	44.74		129	35.34			230	13.0		
1030	4128			32	42.79		129	38.15			228	12.8		
1045	4307			32	40.43		129	41.23			225	12.6		
1100	4650			32	38.15		129	44.07			224	12.9		GREAVES ON WATCH
1115	4288			32	35.45		129	47.44			224	12.9		
1130	4412			32	33.82		129	49.61			225	12.9		
1145	4492			32	31.40		129	52.78			226	12.5		JIM CHECKED SEABEAM WIDTH = WE ARE GETTING ONLY ~8KM
1200	4510			32	29.42		129	55.54			225	12.6		WAKE UP FOR RALPH & TRICIA FOR MAG DEPLOYMENT
1213	4313			32	26.23		129	58.81			244	12.7		MAGNETOMETER DEPLOYED // ON CABLE = COURSE CHANGE
1226	4511			32	25.97		130	00.49			244	12.9		START OF ATT CABLE TRANSIT (ATT)
~~1231~~	~~4414~~			~~32~~	~~25.44~~		~~130~~	~~01.79~~			~~243~~	~~12.8~~		~~END OF ATT CABLE TRANSIT (ATT)~~
1245	4480	4500 11		32	24.19		130	05.24			242	13.0		MAG DISPLAY UP // ON ATTWP 180 (i.e. start compute
1300	4471	4498 5		32	22.90		130	08.25			241	12.8		CHECK WP FOR ATT W/ SHIP WP {ATTWP w/ known
1315	4501	4498 6		32	21.49		130	11.67			242	12.7		STARTED AT ATT/WP {ship location
1330	4692	4495 4		32	19.89		13 0	15.98			242	12.9		
1345	4735	4493 2		32	18.71		130	18.99			242	12.6		≈ ATT WP 179 (32° 18.6', 130 18.9')

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S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: 02 — SHIP: REVELLE — CHECK OPERATIONS — PAGE 5

DATE (DAY, MO, YR): 13 Aug 1997 — TIME ZONE (SHIP): +7 — 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG | ✓ GRAV | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	MIN	N/S	LONGITUDE DEG	MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts — COMMENTS AND OBSERVATIONS
1 4 0 0	4 4 5 4	4 4 9 4 0		32	17.47	N	130	22.23	W		246	12.9		
1 4 1 5	4 5 9 1 3	4 4 8 5 1 3		32	16.20		130	25.71			245	12.9		
1 4 3 0	4 5 5 4	4 4 8 4 7		32	14.88		130	28.20			242	13.0		~ ATT WP 178 (32°14.4', 130°30.0W)
1 4 4 5	4 5 5 6	4 4 8 0 8		32	13.45	T	130	32.67			243	13.1		
1 5 0 0	4 6 4 0	4 4 7 3 7		32	11.89	N	130	37.03	W		243	12.6		Ralph on watch, calm, overcast JD 225
1 5 1 5	4 6 4 5	4 4 7 5 0		32	10.85	W	130	39.53	W		244	12.7		~ ATT WP 177 (32°10.6'N, 130°40.2W) - work on 3.5 plot gun
1 5 3 0	4 6 3 9	4 4 7 1 8		32	09.61		130	42.03			243	12.7		
1 5 4 5	4 6 4 7	4 4 6 4 7		32	08.30	N	130	46.09	W		242	12.9		- adjusting SEABEAM gates
1 6 0 0	4 6 3 4	4 4 6 4 6		32	06.88	N	130	49.76	W		245	12.6		
1 6 2 0	4 7 8 4	4 4 7 7 3		32	05.15		130	54.15			256	13.1		~ ATT WP 176 (32°5.10'N, 130°54.3W)
1 6 3 0	4 7 7 2	4 4 7 7 2		32	04.65	N	130	56.63	W		255	13.2		
1 6 4 5	4 4 5 4	4 4 7 4 9		32	03.09	N	130	00.36	W		252	13.5		
1 6 4 7											248	12.9		c/c 248 ~ ATT WP 175 (32° 3.7'N, 131° 1.2'W)
1 7 0 0	4 4 2 0	4 4 6 0 5		32	02.95	N	131	01.25	W		245	13.0		
1 7 1 5	4 6 5 1	4 4 4 4 3		32	01.60	N	131	07.82	W		241	13.2		
1 7 3 0	4 7 1 3	4 4 4 6 9		32	00.23	N	131	11.57	W		244	13.1		
1 7 4 5	4 6 3 0	4 4 6 3 4		32	58.96	N	131	15.07	W		244	13.0		
1 8 0 0	4 5 2 9	4 4 6 8 0		31	57.33		131	18.10			245	12.9		
1 8 1 5	4 6 2 5	4 4 5 6 3		31	56.79	N	131	21.61	W		244	12.6		
1 8 1 9														
1 8 3 0	4 6 7 3	4 4 6 7 0 6		31	55.99	N	131	25.25	W		257	13.3		c/c 260 ~ ATT WP 174 (31°56.30'N, 131° 22.90'W)
1 8 4 5	4 5 0 5	4 4 2 3 5		31	55.41	W	131	29.00			257	13.4		
1 9 0 0	4 5 5 2	4 4 3 0 2		31	54.81		131	32.79			258	12.7		Swift on watch JD 225 Aug 13-
1 9 1 5	4 5 7 2	4 4 3 2 7		31	54.22		131	36.62			258	13.1		
1 9 3 0	4 5 7 9	4 4 2 6 4		31	53.61		131	40.44			257	12.3		
1 9 4 5	4 5 4 5	4 4 2 5 7		31	53.02		131	44.24			257	12.9		ATT WP# 173
2 0 0 5	4 6 2 4	4 4 4 4 5		31	51.80		131	49.55			233	13.2		C/C 233° WP # 172
2 0 1 2														C/C 241° WP # 171
2 0 1 5	4 5 2 5	4 4 4 3 6		31	50.61		131	51.68			239	12.8		
2 0 3 0	4 5 2 1	4 4 2 7 7		31	49.16		131	54.67			237	12.5		
2 0 4 0	4 7 6 1	4 4 1 4 0		31	47.03		131	57.29			236	12.3		C/C to 242 WP # 170
2 0 4 5	4 7 7 9	4 4 1 0 7		31	47.50		131	59.18			236	12.9		
2 1 0 0	4 6 6 1	4 4 2 3 4		31	45.96		132	1.59			238	12.5		
2 1 1 5	4 6 6 5	4 4 3 0 9		31	44.46		132	5.03			238	12.5		
2 1 3 0	4 4 2 7	4 2 3 8 0		31	42.23		132	8.41			237	12.7		
2 1 4 5	4 5 4 9	4 4 2 4 4		31	41.17		132	11.75			239	12.2		
2 2 0 0	4 5 9 3	4 4 1 5 0		31	39.62		132	15.13			240	12.9		

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S.I.O. UNDERWAY WATCH LOG — CRUISE: Kiwi — LEG: 02 — SHIP: ROGER REVELLE — CHECK OPERATIONS — PAGE 6

DATE (DAY, MO, YR): 13 AUG 1997 — TIME ZONE (SHIP): +7 — 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG | ✓ GRAV | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	MIN	N/S	LONGITUDE DEG	MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE 240 ● 12.2 kts — COMMENTS AND OBSERVATIONS
2 2 1 5	4 5 8 9	4 3 9 8 1		31	38.02	N	132	18.75	W		239	12.3		~ ATT WP 169
2 2 3 0	4 6 8 1	4 3 9 5 5		31	36.50		132	22.14			239	13.1		
2 2 4 5	4 6 8 2	4 4 0 3 7		31	34.98		132	25.54			240	12.7		
2 3 0 0	4 6 1 7	4 4 0 8 8		31	33.46		132	28.89			237	12.9		GRAVITY ON WATCH JD 225
2 3 1 5	4 7 4 7	4 4 1 0 6		31	31.71		132	32.22			239	12.9		
2 3 3 5	4 8 6 2	4 4 0 5 4		31	29.83		132	36.23			240	12.9		PAPER CHANGE ON CALCOMP ~ ATT WP 168 (31°29.4, 132°37.2
2 3 4 5	4 8 2 9	4 3 9 8 6		31	28.56		132	38.93			239	12.6		
0 0 0 0	4 7 9 2	4 3 9 2 8		31	26.87		132	42.60			240	12.9		JD 226 (8-14-97)
0 0 1 5	4 4 5 7	4 3 9 0 0		31	25.49		132	45.57			240	13.1		
0 0 3 0	4 6 0 3	4 3 8 9 9		31	23.77		132	49.24			239	12.8		
0 0 4 5	4 5 8 1	4 3 9 0 3		31	22.16		132	52.73			240	13.1		
0 1 0 0	4 6 2 5	4 3 9 0 0		31	20.67		132	55.80			240	12.7		
0 1 1 5	4 7 3 5	4 3 9 1 2 5		31	19.13		132	59.68			240	13.2		~ ATT WP 167 (31°20.0, 132°57.4')
0 1 3 0	4 5 7 7	4 3 8 8 3		31	17.45		133	03.08			240	13.1		
0 1 4 6	4 5 8 6	4 3 7 3 9		31	15.83		133	06.61			238	12.7		JIM DOING XBT for new SVP
0 2 0 0	4 5 0 2	4 3 5 0 8		31	14.39		133	09.39			238	12.7		NEW SVP03 entered by Jim (sound velocity profile)
0 2 1 7	4 6 9 8	4 3 6 1 0		31	12.44		133	13.13			239	13.1		
0 2 3 3	4 7 2 1	4 3 6 8 3		31	10.82		133	16.82			242	13.2		
0 3 0 0	4 5 7 5	4 3 7 3 8		31	08.24		133	22.71			241	13.3		~ ATT WP 166 (31°10.8, 133°17.2')
0 3 1 5	4 6 7 2	4 3 7 0 8		31	06.73	N	133	26.28	W		239	12.8		
0 3 3 0	4 7 3 0	4 3 5 1 1		31	05.02	W	133	29.77	W		255	12.7		Ralph on watch - delayed schedule to change local clocks
0 3 4 5	4 7 0 8	4 3 5 2 2		31	04.25		133	33.12			253	13.2		WP # 165 c/c 255° (31°5', 133°29.5)
0 4 0 0	4 6 8 9	4 3 3 7 2		31	03.37	N	133	36.77	W		251	13.3		
0 4 0 5														
0 4 1 5	4 4 8 2	4 3 3 0 2		31	02.64	N	133	40.19	W		255	13.0		WP # 164 (31°3', 133°38') c/c 257°
0 4 3 0	4 5 0 8	4 3 2 6 0		31	01.87	N	133	43.86	W		253	13.0		
0 4 4 5	4 6 6 3	4 3 2 7 9		31	01.09	N	133	47.55	W		252	13.1		
0 5 0 0	4 6 5 1	4 3 3 8 4		31	00.31	N	133	51.26	W		254	12.8		
0 5 1 5	4 6 3 3	4 3 4 3 3		30	59.55	N	133	55.19			255	12.6		
0 5 3 0	4 7 7 3	4 3 3 9 5		30	58.80	N	133	58.66	W		254	13.0		
0 5 3 1														
0 5 4 5	4 4 4 6	4 3 3 8 3		30	58.02	N	134	02.33	W		254	13.0		WP # 163 (30°58.70', 133°59.10') c/c 256°
0 6 0 0	4 7 0 4	4 3 4 0 3		30	57.24	N	134	06.21	W		254	13.1		
0 6 1 5	4 7 6 6	4 3 3 6 4		30	56.46	N	134	09.66	W		253	13.1		
0 6 3 0	4 8 1 3	4 3 3 6 4		30	55.65	N	134	13.39	W		255	13.1		

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S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: Ø2 — SHIP: REVELLE — DATE (DAY. MO. YR): 14 AUG 97 — TIME ZONE (SHIP): +7 — CHECK OPERATIONS — PAGE 7 — 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG ✓ | GRAV ✓ | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG MIN N/S	LONGITUDE DEG MIN E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	COMMENTS AND OBSERVATIONS
										ON CSE 254 @ 13.2 kts
0614	4817	4316		30 54.87 N	134 17.37 W		255	12.9		
0615										WP # 162 (30° 54.10, 134° 20.70) C/C 257°
0700	4916	4329		30 54.08 N	134 20.84 W		254	13.3		
0715	4818	4314		30 53.31 N	134 24.57 W		255	12.9		
0730	4796	4305		30 52.61 N	134 28.35 W		256	13.1		
0745	4716	4311		30 51.87	134 32.14		255	13.3		
0810	4795	4311		30 51.12	134 35.95		255	13.3		Sw. lift on watch, JD 226 14-Aug 1997
0811	4731	4311		30 50.39	134 39.76		256	13.0		
0831	4653	4311		30 49.63	134 43.56		254	13.1		
0837	4699	4311		30 49.19	134 45.60		241	13.4		C/C 237° WP # 160 (30° 49.10'N, 134° 46.00'W)
0845	4755	4312		30 48.45	134 47.43		237	13.0		
0910	4712	4311		30 46.68	134 50.56		236	13.0		changed wall clocks from 0200L (+7) to 0100L (+8)
0911	4798	4309		30 44.72	134 54.05		235	13.4		
0931	4695	4291		30 42.80	134 57.31		235	13.1		
0942	4708	4291		30 41.21	135 00.21		257	13.5		C/C 258° WP # 159 (30° 41.20'N, 135° 2.00'W)
0945	4751	4295		30 41.16	135 00.47		257	13.3		
0955	4941	4301		30 40.62	135 03.32		255	13.4		C/C 251° WP # 158 (30° 40.60'N, 135° 3.50'W)
1010	4951	4301		30 40.38	135 4.35		250	13.1		
1015	4736	4291		30 39.24	135 8.39		250	13.2		C/C 252° WP # 157 (30° 39.20'N, 135° 8.20'W)
1030	4748	4291		30 38.11	135 12.12		250	13.0		
1040	4671	4291		30 37.40	135 14.56		250	13.4		C/C 255 WP # 156 (30° 37.40'N, 135° 14.76'W)
1100	4741	4281		30 36.37	135 19.26		255	13.5		
1118	4531	4281		30 35.89	135 21.49		242	13.1		C/C 233 WP # 155 (30° 35.80'N, 135° 21.70'W)
1115	4387	4284		30 35.24	135 22.81		231	13.0		
1130	4471	4285		30 33.29	135 25.42		233	13.2		
1145	4474	4286		30 31.28	135 28.48		233	12.9		
1200	4514	4276		30 29.16	135 32.23		231	13.0		GRAVES ON WATCH
1204	4385	4275		30 28.11	135 33.87		231	13.1		WP 29 (no course change) ~ ATTWP 154 (30°27.9, 135°34.0')
1215	4510	4276		30 27.00	135 35.52		231	12.8		
1230	4721	4278		30 25.37	135 38.22		235	13.1		
1245	4810	4281		30 23.38	135 41.55		233	13.0		
1300	4714	4278		30 21.50	135 44.88		235	13.0		
1315	4381	4269		30 19.61	135 47.80		234	13.0		
1330	4510	4268		30 17.74	135 50.90		232	13.0		~ ATT WP 153 (30° 17.10, 135° 52.00)
1345	4656	4264		30 15.95	135 54.14		231	12.8		
1400	4776	4262		30 13.84	135 57.28		233	13.1		
1415	4536	4258		30 11.92	136 00.75		232	13.2		

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S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: Ø2 — SHIP: REVELLE — DATE (DAY. MO. YR): 14 AUG 97 — TIME ZONE (SHIP): +8 — CHECK OPERATIONS — PAGE 8 — 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG ✓ | GRAV ✓ | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG MIN N/S	LONGITUDE DEG MIN E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	COMMENTS AND OBSERVATIONS
										ON CSE ____ @ ____ kts
1430	4725	4262		30 09.81 N	136 03.82 W		233	12.5		JD 226
1445	4711	4249		30 08.14	136 06.24		231	13.0		
1500	4515	4257		30 06.09	136 09.86		232	13.0		~ ATT WP 152 (30°6.00', 136°10.0')
1502				30 05.87	136 10.26		245	12.7		C/C 245°
1512	4542	4253		30 04.69	136 13.30		242	12.8		
1530	4865	4255		30 03.31	136 16.78		244	12.8		CHANGING CALCOMP PAPER
1541	4570	4258		30 01.93	136 20.21		245	12.9		
1600	4523	4253		30 00.60 N	136 23.64		244	13.1		Ralph on watch - overcast, calm
1601										GO TO CW MODE ON 3.5
1617	4583	4228		29 59.04 N	136 27.54 W		244	13.1		
1623							##			WP 151 (29°58.4'N, 136°29.10'W) C/C 243
1630	4563	4218		29 57.91 N	136 30.49 W		239	12.9		3.5 SOFTWARE PROBLEM.
1645	4371	4212		29 56.39 N	136 33.59 W		240	12.5		
1701	4736	4212		29 54.88 N	136 36.97 W		243	12.9		
1711	4617	4202		29 53.41 N	136 40.44 W		240	13.1		
1735	4724	4202		29 51.38	136 44.90		244	13.1		
1738										WP 150 (29°50.9'N, 136°46.00'W) C/C 270
1745	4791	4215		29 50.93 N	136 47.56 W		268	12.7		
1759	4582	4202		29 50.92	136 49.87		269	13.2		WP 149 (29° 50.90'N, 136° 50.00'W) no C/C
1810	4564	4202		29 50.41	136 51.16		269	12.2		Swift on watch, calm seas, low wind
1811	4453	4202		29 50.87	136 55.00		270	11.3		
1830	4648	4202		29 50.91	136 58.81		269	12.3		
1845	4710	4211		29 50.91	137 2.86		269	10.8		
1910	4611	4211		29 50.90	137 6.90		267	11.8		
1911	4524	4202		29 50.89	137 10.96		269	12.6		
1912	4653	4211		29 50.89	137 12.23		269	13.7		WP 148 (29° 50.90'N, 137° 12.16'W) no C/C
1930	4580	4201		29 50.88 W	137 14.26 W		270	13.0		
1945	4414	4202		29 50.88 N	137 17.63 W		270	13.2		E → W
2010	4601	4202		29 50.86	137 21.89		269	13.1		2000 – 2030 transition from rough to smooth SE
2015	4717	4212		29 50.82	137 25.67		269	13.0		
2030	4751	4201		29 50.81	137 29.47		269	13.1		2039 BATHY 2000 BACK ON LINE
2045	4619	4211		29 50.88	137 32.27		271	13.5		2046 C/C 274° WP 147 (137 33.7 W 29 50.9 N)
2053	4617	4212		29 51.00	137 35.50		242	13.0		2053 C/C 242° WP 146
2100	4646	4211		29 50.44	137 36.90		240	13.1		
2115	4704	4202		29 48.86 N	137 40.26 W		239	12.9		
2130	4634	4211		29 47.29	137 43.62		240	12.6		
2145	4730	4202		29 45.72	137 46.98		240	12.7		

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S.I.O. UNDERWAY WATCH LOG | CRUISE: Kiwi | LEG: Ø2 | SHIP: Roger Revelle | CHECK OPERATIONS | PAGE 9

DATE (DAY. MO. YR): 14 Aug 97 JD 226 | TIME ZONE (SHIP): +8 | 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG | ✓ GRAV | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	MIN	N/S	LONGITUDE DEG	MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts COMMENTS AND OBSERVATIONS
22106	4174	4233		29	44.14	N	137	50.33	W		239	12.7		
22111														wp #145. (29°42.9', 137°53.2') c/c 245°
22155	4785	4261		29	42.64		137	53.13			244	13.3		
22215	4710	4181		29	41.77		137	56.07			236	13.2		wp #144 (29°41.70'N, 137° 56.20'W) c/c 237°
22313	4631	4179		29	40.98		137	57.59			234	13.2		
22415	4406	4180		29	39.42		137	00.38			234	12.9		2200 - 2215 Z transition E-W lava Sm to roughSF
23006	4185	4180		29	37.56		137	3.57			234	12.9		2305 changed chart paper 32" per deep long
23115	4744	4176		29	35.70		137	6.72			234	13.2		horiz distance
23300	4696	4172		29	33.88		137	9.86			234	13.3		Opened gates so more beams recorded
23319	4711	4166		29	32.67		137	11.96			234	13.2		wp #143 (29° 32.50'N, 138° 11.50'W) c/c 235°
23455	4732	4165		29	31.82		138	13.43			234	13.3		GAINES ON WATCH
00000	4730	4164		29	30.23		138	16.17			233	13.1		JD 227 (~~Tuesday~~) — 15 AUG/97
00006	4771	4161		29	28.48		138	17.43			230	13.2		c/c 236° (WPATT 142) (29°29.50', 138°13.20')
00115	4781	4160		29	28.30		138	19.25			232	13.5		*TRUE HEADING
00215														SETTING UP TO TEST GI GUN
00300	4696	4160		29	26.46		138	22.38			235	13.0		~~WP~~ ~ ATT WP 141
00354														GI Gun Deployed a firing note: only works when in water a tiny seal chamber by bulk pressure of water column.
01033	4720	4181		29	24.55		138	25.78			233	4.4		SHIP SLOWED TO PUT GUN IN AND DEPLOY
01038														SCS array s/c Elenita (missed WP141 on log)
01155	4712	4169		29	23.66	W	138	26.97	W		234	7.7		SPEED SET FOR SCS SHOOTING
01301	4572	4176		29	22.84		138	28.37			234	7.3		*TRUE HEAD
01411	4587	4169		29	22.00		138	30.09			245	7.8		c/c 253 ATT WP 140 (29°22.00, 138° 30.00')
01455	4594	4168		29	21.58		138	30.61			251	7.7		SVP #04 entered into seabeam system
02001	4656	4165		29	21.29		138	32.89			249	7.4		
02116	4795	4175		29	20.70		138	34.89			249	7.8		We have noticed that there is some degradation of the Seabeam plot (calcomp) contour map since towing steps
02230	4840	4172		29	20.20		139	36.8			249	7.6		
02346	4831	4164		29	19.63		138	38.97			250	7.7		
03000	4782	4161		29	19.13		138	40.89			249	8.0		
03115	4599	4160		29	18.61		138	42.97			250	7.3		
03217	4634	4159		29	18.30		138	43.39			251	7.9		ATT WP 139 (29°18.70, 138°42.60') (no course change)
03330	4619	4157		29	18.08		138	45.01			250	7.5		
03445	4751	4153		29	17.54		138	47.12			249	7.8		SCS LINE Ø1 RECORDING
04010	4723	4148		29	16.99		138	49.24			250	7.8		RESET ANALOG SEIS FILTERS TO 10-250Hz
														SI of recording is 1ms

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S.I.O. UNDERWAY WATCH LOG | CRUISE: KIWI - Ø2 | LEG: | SHIP: REVELLE | CHECK OPERATIONS | PAGE 10

DATE (DAY. MO. YR): 15 AUG 97 | TIME ZONE (SHIP): +8 | 12 kHz | 3.5 kHz ✓ | SEIS.Prof ✓ | MAG ✓ | GRAV ✓ | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	MIN	N/S	LONGITUDE DEG	MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts COMMENTS AND OBSERVATIONS
04115	4619	4151		29	16.42	N	138	51.36	W		249	7.9		RALPH ON WATCH - CALM - JD 227.
04305	4511	4141		29	15.77	N	138	53.78	W		251	8.1		
04455	4516	4136		29	15.32	N	138	55.46	W		250	7.9		
05010	4616	4131		29	14.73	N	138	57.71	W		250	7.7		
05115	4613	4134		29	14.16	N	138	59.73	W		250	8.0		
05310	4611	4133		29	13.58	N	139	02.35	W		252	7.8		
05412														WP# 138 (29°13.2, 139°3.8) c/c 246°
05545	4617	4134		29	13.07	N	139	04.26	W		252	8.2		
06017	4731	4131		29	12.48	N	139	07.57	W		250	8.0		
06115	4718	4130		29	11.89	N	139	08.58	W		250	7.8		
06330	4766	4129		29	11.26	N	139	10.78	W		250	8.0		
06445	4719	4128		29	10.66	N	139	12.97	W		251	8.0		
07010	4827	4127		29	10.05	N	139	15.18	W		252	9.8		
07115	4791	4127		29	09.45	N	139	17.38	W		252	7.5		
07330	4781	4123		29	08.84	N	139	19.77	W		252	7.6		
07445	4830	4121		29	08.30	N	139	21.59	W		251	7.6		
08100	4821	4116		29	7.64		139	23.91			252	7.4		Switch on watch 15-Aug 97 JD 227
08104	4812	4114		29	7.43		139	24.63			250	7.9		wp #137 (29° 7.5'N, 139 24.6'W) c/c 251
08115	4812	4117		29	6.97		139	26.05			250	7.7		
08330	4991	4121		29	6.27		139	28.19			250	7.8		Recording SCS Line H20-01 5.0 sec delay
08415	4832	4114		29	5.64		139	30.37			254	8.1		4.0 sec record
09010	4862	4116		29	5.14		139	32.44			254	8.0		
09115	4918	4126		29	4.45		139	34.78			252	7.6		
09310	4814	4130		29	3.79		139	36.99			252	7.7		
09415	4814	4129		29	3.18		139	39.06			251	7.9		
10106	4826	4124		29	2.52		139	41.32			252	8.0		Ahead of us.
10115	4814	4117		29	1.84		139	43.77			252	7.8		ship Approaching. Steering
10227	4781	4111		29	1.22		139	45.48			240	7.6		wp 136 (29° 1.30'N 139° 45.40'W) c/c 255° to avoid.
10330	4764	4120		29	1.03		139	46.01			231	7.9		1033Z Changed Calcomp chart paper c/c 233
10446	4771	4120		28	59.71		139	45.26			232	8.2		
11010	4798	4118		28	58.76		139	49.53			231	7.8		
11115	4735	4113		28	57.56		139	51.93			230	8.0		
11310	4791	4111		28	56.41		139	53.68			228	8.1		
11455	4752	4115		28	55.16		139	55.55			228	8.0		
12010	4840	4109		28	53.91		139	57.44			228	8.1		
12115	4812	4107		28	52.60		139	59.43			227	7.9		GAINES ON WATCH
12310	4782	4105		28	51.55		140	01.26			226	8.2		

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S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: Ø2 — SHIP: ROGER REVELLE — DATE (DAY, MO, YR): 15 AUG 97 — TIME ZONE (SHIP): +8 — CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG | GRAV ✓ | SeaB ✓ — PAGE 11

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG MIN N/S	LONGITUDE DEG MIN E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts COMMENTS AND OBSERVATIONS
12 45	4776	4089816		28 50.13 N	140 03.07 W		226	8.2		GRIDLINES ON MARGIN ~ AT WP 134 (28° 50.10, 140° 3.10')
13 00	4791 12	40 9 7 15		28 48.94	140 04.90		230	8.0		
13 15	4818 77	40 9 8 14		28 47.76	140 06.77		229	7.9		
13 30	4858 18	41 0 1 15		28 46.62	140 08.64		228	7.8		
13 45	4818 46	41 0 3 8		28 45.47	140 10.41		228	7.8		
14 00	4818 35	41 0 2 2		28 44.33	140 12.24		228	7.7		
14 15	4818 45	40 9 9 4		28 43.17	140 14.05		230	7.8		
14 30	4716 18	40 9 5 0		28 41.95	140 16.02		229	7.9		* NOTICED DATA WRITE FAIL AND EXABYTE WRITE FAIL ON SCS MONITOR DISPLAY / SETH UP AND CHECKING ON IT / BACK OK, BUT
14 39										SETH ALSO NOTICED THERE IS ~7hr time bias
14 45	4613 1	40 9 2 14		28 40.87	140 17.73		228	8.2		- WILL NEED TO LOOK AT LOG FILE TO CHECK WHAT
15 00	4818 15	40 8 9 6		28 39.72	140 19.57		227	8.1		DATA HAS ACTUALLY BEEN RECORDED
15 15	4818 15	40 9 0 1		28 38.57	140 21.35		229	8.1		WP 133 (28° 38.80', 140° 21.00')
15 30	4818 11	40 9 2 6		28 37.42	140 23.14		229	8.1		
15 45	4818 09	40 8 4 6		28 36.25	140 24.96		232	7.7		
16 00	4819 13	40 9 4 3		28 35.11 N	140 26.85 W		232	7.7		Ralph on watch - overcast calm, JD 227
16 15	4819 19	40 9 4 9		28 33.97 N	140 28.79 W		270	7.9		WP 132 c/c 269
16 20										← Setup and SCS A/D - end of line H20-01
16 30	4818 17	40 8 7 9		28 33.94 N	140 30.86 W		266	8.2		- Start of line H20-01A -
16 45	4817 15	40 7 7 6		28 33.92 N	140 33.21 W		266	8.2		- corrected 6h 59m 00s
17 00	4815 11	40 7 4 4		28 33.90	140 35.27		266	7.7		
17 15	4816 19	40 7 4 5		28 33.87	140 37.49		267	8.3		4953 L1a
17 37	4816 12	40 7 2 6		28 33.82	140 40.75		271	7.7		
17 40	4819 11	40 7 1 8		28 33.81	140 41.19		274	7.9		WP 131 Breaking off from cable. Returning to Survey site. 5113
17 45	4819 16	40 7 1 1		28 34.02	140 41.8		341	6.5		5130
18 00	4919 12	40 7 3 4		28 35.48	140 40.99					5231 C/S to 12 kts
18 15	4919 15	40 7 6 2		28 37.02	140 39.06		55	9.5		5313 L1a
18 30	4919 11	40 7 3 9		28 38.76 N	140 36.63 W		52°	11.9		
18 45	4715 17	40 7 5 10		28 40.37 N	140 33.73 W		55°	10.0		
19 00	4919 40	40 9 1 3		28 42.03 N	140 30.94 W		55°	8.1		started line H20-02 C/S 8.0 kt
19 14										WP 1 at Isla Emily, c/c 90° shot # 5580
19 15	4911 19	40 9 5 9		28 43.06 N	140 26.63 W		93°	9.2		
19 30	4916 10	40 9 10 8		28 42.99 N	140 24.19 W		87°	6.6		
20 00	4813 12	40 8 7 6		28 43.02	140 21.90		83	8.3		5939
20 15	4816 10	40 8 7 15		43.05	19.44		82	9.1		6033
20 18				43.05	18.98					6049 EOL 2 C/S 270

S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: Ø2 — SHIP: ROGER REVELLE — DATE (DAY, MO, YR): 15 AUG 97 — TIME ZONE (SHIP): +8 — CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG ✓ | GRAV ✓ | SeaB ✓ — PAGE 12

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG MIN N/S	LONGITUDE DEG MIN E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts COMMENTS AND OBSERVATIONS
20 30	4763	4089 9		28 41.55 N	140 18.16 W		180	8.6		6123 in turn to WP # 3
20 39	4810 17			28 40.89	140 18.56					6172 changed SCS recording Line 2 → Line 3
20 47	4818 18	4089 7 3		28 40.67	140 19.90		270	7.9		6218 c/c 270° begin Line 3 WP # 3
21 02	4818 11	4089 8 4		28 40.59	140 22.14		260	7.9		6313
21 15	4818 5 8	4089 6 15		28 40.55	140 23.50		264	7.7		6386
21 30	4818 43	4089 2 8		28 40.53	140 26.23		271	7.8		6478
21 45	4819 11 8	4089 3 10		28 40.55	140 28.34		267	8.1		6566
21 48	4819 27	4089 2 8		28 40.56	140 28.89		260	8.1		6586 C/C WP # 4 EOL 3
22 00	4819 20	4089 4 8		28 39.49	140 29.89		178	7.8		6660
22 10	4819 15			28 38.83	140 29.85		157	7.4		6684 - stop 6685 - start SCS recording Line 3 → Line 4
22 11	4818 19	4089 8 7		28 38.24	140 28.87		89	7.8		6737 c/c 90° WP # 5 BOL 4
22 11 5	4818 17	4089 0 1		28 38.24	140 28.72		90	8.1		6745
22 13 0	4819 19	4089 1 8		28 38.20	140 26.48		90	8.4		6835
22 14 5	4818 10	4089 1 8		28 38.18	140 24.39		91	7.8		6924
23 00	4818 10 3	4089 0 6		28 38.16	140 22.00		91	8.1		7013 2301 - 2302 3.5 analog plotter off to adjust paper
23 11 9	4818 11 5	4089 8 8		28 38.12	140 19.15		91	8.5		7130 c/c to 180 WP # 6 EOL 4
23 30	4818 10	4089 9 5		28 37.21	140 18.22		180	8.3		7194
23 33	4818 18	4089 8 3		28 36.81	140 18.23		180	7.9		7209 - stop 7210 - begin SCS Line 4 → Line 5
23 41 2	4818 18	4089 7 3		28 35.91	140 19.10		267	8.1		7269 C/C to 270 WP # 7 BOL 5
23 49 5	4818 17	4089 7 3		28 35.90	140 19.40		276	8.2		7281
01 00 10	4818 11	4089 1 13		28 35.84	140 21.73		263	8.8		7373 JD 228 (16 Aug 97)
01 01 5	4817 810	4089 1 5 11		28 35.76	140 24.07		266	8.3		7462 re-starting 3.5 kHz bathy
01 03 10	4818 21	4089 1 3 8		28 35.79	140 26.42		269	8.2		7552
01 04 15	4815 14 5	4089 2 12		28 35.80	140 28.77		270	8.3		7642
01 04 17	4816 746			28 35.78	140 29.33					7659 WP # 8 c/c 180°
01 05 10	4829 5			28 35.74	140 29.38					7673 STOP EOL 5
01 05 12	4819 13			28 35.50	140 29.35		206	8.0		7674 START c/Line 5 to Line 6
01 10 0	4819 12	4089 0 10		28 34.68	140 29.82		179	8.5		7724
01 11 1	4818 18	4089 1 15		28 33.39	140 29.11		90	7.8		7790 WP # 9 - c/c 90° BOL 6
01 11 15	4818 15	4089 3 2		28 33.38	140 28.51		91	8.0		7814
01 13 0	4818 16 2	4089 3 9		28 33.35	140 26.25		91	7.7		7909
01 14 15	4818 14	4089 49		28 33.40	140 24.01		91°	7.9		7994
01 15 16	4818 13	4089 3 3		28 33.39	140 22.21		87°	8.0		8060 new SVP # 05 loaded for Sea beam
02 00 0	4818 14	4089 2 1		28 33.39	140 21.76		86	7.9		8084
02 01 15	4818 19	4089 5 8		28 33.40	140 19.49		93	8.1		8174 WP # 10 EOL 6
02 02 1				28 33.33	140 18.61					8217 c/c 180°
02 02 14				28 33.08	140 18.28		152	7.7		8218 STOP START 8219 BOL 7

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S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI 1 — LEG: 02 — SHIP: ROGER REVELLE — PAGE 13
DATE (DAY. MO. YR): 16 Aug 97 — TIME ZONE (SHIP): +8
CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof ✓ | MAG ✓ | GRAV | SeaB ✓
ON CSE ____ @ ____ kts

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LAT DEG	LAT MIN	N/S	LONG DEG	LONG MIN	E/W	CHANGE TIME	CSE GYRO	SPD KNOT	CODE	COMMENTS AND OBSERVATIONS
0230	4786	40851		28	32.75	W	140	18.17	W		186	8.4		8260 JD 228 (16 Aug 97)
0243	4781	40853		28	30.85		140	18.92			270	8.4		8337 c/c 260 WP#11 BOL 7
0245	4796	40853		28	30.91		140	19.39			261	8.3		8351
0300	4766	40882		28	30.73		140	21.88			261	8.4		8441
0315	4871	40917		28	30.38		140	24.03			261	8.4		8530
0330	4843	40915		28	30.10		140	26.35			264	8.0		8620
0345	4882	40879		28	29.85		140	28.72			265	8.2		8710
0359	4948	40777		28	29.99		140	30.66			332	8.5		c/c 0° EOL 7 ~WP 12
0400	4948	40778		28	30.27		140	30.81			353	7.1		8801
0403	4948	40786		28	30.74		140	30.85						8817 STOP 8818 START BOL 8
0415	4943	40839		28	32.03		140	30.39			83	8.4		8887
0429	4891	40910		28	32.19		140	29.08			89	7.9		8940 WP 13 c/c 90°
														Ralph on watch calm overcast nice sunset
														-changing local clocks back tonight.
0430	4852	40931		28	32.18	N	140	28.19	W		95°	7.9		
0445	4869	40942		28	32.19	N	140	25.95	W		89°	7.4		
0500	4871	40942		28	32.21	N	140	23.75	W		89°	7.8		9163
0515	4820	40910		28	32.19	N	140	21.52	W		89°	8.1		9253
0530	4779	40868		28	32.19	N	140	18.99	W		83°	7.7		~~c/c~~
0531														9348 c/c 0° WP14 EOL 8.
0540														9397 stop 9398 START line 9
0545	4767	40856		28	33.47	N	140	18.13	W		342°	8.0		9430
0555														9487 c/c 270° BOL 9 WP#15.
0600	4813	40864		28	34.61	N	140	19.82	W		271°	8.4		9521
0615	4802	40930		28	34.61	N	140	22.23	W		275°	8.4		9605
0630	4870	40961		28	34.59	N	140	24.64	W		269°	8.7		9695
0645	4884	40939		28	34.57	N	140	27.03	W		268°	8.5		9785
0657														9858 c/c 0° EOL 9 WP #16
0700	4918	40920		28	34.64	N	140	29.43	W		296	8.0		9875
0707														9917 stop 9918 start line 10
0715	4908	40885		28	36.33	N	140	29.87	W		035	8.1		9964
0723														10015 C/C 090° BOL 10 WP #17
0730	4866	40905		28	36.97	N	140	28.00	W		92°	7.1		10055
0745	4874	40923		28	36.98	N	140	25.81	W		92°	8.3		10144
0800	4801	40925		28	37.00	N	140	23.64	W		97	7.8		10234
0815	4773	40901		28	37.01	N	140	21.37	W		86	8.3		10324
0830	4808	40683		28	36.99		140	19.01			91	7.2		10418 c/c 0° EOL 10 WP#18

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S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: 02 — SHIP: ROGER REVELLE — PAGE 14
DATE (DAY. MO. YR): 16 Aug 97 — TIME ZONE (SHIP): +8
CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof ✓ | MAG ✓ | GRAV | SeaB ✓
ON CSE ____ @ ____ kts

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LAT DEG	LAT MIN	N/S	LONG DEG	LONG MIN	E/W	CHANGE TIME	CSE GYRO	SPD KNOT	CODE	COMMENTS AND OBSERVATIONS
0845	4589	40904		28	38.33	N	140	18.06	W		358	8.2		10504
0848	4562	40919		28	38.75		140	18.09			335	8.1		10523 - Stop Line 10 Begin Line 11 — 10524
0855	4811	40900		28	39.39		140	18.86			270	8.5		10561 c/c 270° WP 19 BOL 11
0900	4812	40895		28	39.43		140	19.67			272	8.2		10591
0906	4816	40890		28	39.50		140	20.81			272	8.4		10630 called Bridge to C/S to 8.0 kts
0915	4801	40898		28	39.50		140	22.02			271	8.0		10681
0930	4850	40910		28	39.49		140	24.27			278	8.0		10773
0945	4901	40920		28	39.46		140	26.51			270	8.0		10862
1000	4907	40912		28	39.44		140	28.61			268	7.9		10951 changed local clocks +8 => +9
1001	4918	40906		28	39.43		140	29.06			270	8.0		10961 c/c 0° WP #20 EOL 11
1012	4925	40895		28	40.43		140	29.95			0°	8.0		11025 - Stop recording Line 11 11026 - Begin Line 12
1015	4928	40905		28	40.69		140	29.95			0°	8.0		11039
1026	4919	40935		28	41.71		140	29.21			88	7.8		11105 c/c 90° WP #21 BOL 12
1045	4456	40936		28	41.79		140	26.48			92	8.1		11219 Summit of hill, 3.5 off scale: SF return too weak
1100	4664	40916		28	41.76		140	24.25			88	7.7		11309
1108	4748	40901		28	41.77		140	23.07			92	7.8		11357 EOL 12 WP # 22 (revised) coming starboard C/c
1115	4827			28	41.32		140	22.25			172	9.4		11402 ~~c/s 12 kts~~ c/s 12 kts
1116														11410 - Stop recording Line 12
1117	4821			28	40.85		140	22.23			202	10.9		11411 begin " Line 13
1124	4868	40909		28	40.11		140	23.07			242	11.6		11453 Finished Turn. Heading for ATT WP 131
1130	4846	40915		28	39.68		140	24.29			245	11.5		11486
1145	4901	40922		28	38.56		140	27.33			243	11.9		11581
1200	4904	40870		28	37.43		140	30.42			243	11.9		11666
1215	4828	40753		28	36.30		140	33.52			250	11.9		11760
1236	4811	40742		28	35.52		140	36.73			251	11.9		11846 1239 changed Calcomp plotter paper 32"/degr long.
1245	4845	40748		28	34.50		140	39.85			242	11.6		11936 ~ATT WP 131 GRAFUIS on WATCH
1252	4896	40718		28	33.88		140	41.45			260	12.1		11970 c/c 264° / told bridge to slow to 7.5 knots
1300	5036	40703		28	33.69		140	42.80			264	8.1		12030
1316	4882	40697		28	33.48		140	45.23			262	7.8		12125
1330	4911	40676		28	33.27		140	47.50			258	8.0		12210
1345	4914	40671		28	33.08		140	49.61			26?	8.0		12297
1400	4864	40673		28	32.90		140	51.85			240	7.9		12387
1415	4962	40656		28	32.67		140	54.23			265	7.7		12480
1430	4863	40639		28	32.51		140	56.33			264	8.1		12567
1445	4871	40650		28	32.29		140	58.57			268	7.7		12657
1500	4849	40633		28	32.11		140	00.88			258	8.2		12747
1508	4849	40629		28	31.97		141	02.04			242	8.0		12795 c/c 230° ~ATT WP 130

GDC MARCH 1978 (rev DEC 1993)

S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: 02 — SHIP: ROGER REVELLE — DATE (DAY, MO. YR): 16 Aug 97 — TIME ZONE (SHIP): +9 — PAGE 15

CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof ✓ | MAG ✓ | GRAV | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts — COMMENTS AND OBSERVATIONS
1515	4879	4061	30	28	31.45	N	141	02.92	W		235	8.0		ID 228 SP 12837 course 231°
1512	4818	4061	39	28	30.61		141	04.10			229	7.8		Passed ATT WP 129 ~SP 12892
1530	4818	4061	43	28	30.18		141	04.69			225	8.2		12927
1545	4912	4061	49	28	28.90		141	06.47			227	8.3		13017
1600	4914	4061	54	28	27.55		141	08.34			225	7.4		13108
1611	4815	4061	40	28	26.36		141	09.91			225	7.5		13198
1630	4815	4061	12	28	25.13		141	11.66			229	8.0		13287
1645	4817	4057	13	28	23.78		141	13.52			226	8.2		13383
1700	4857	4055	14	28	22.54	N	141	15.22	W		229	7.1		13470 C/S 6 clicks Ralph on watch
1716	4717	4055	5	28	21.54	N	141	16.62	W		230	6.4		13568 Clear, calm, sunny
1730	4838	4056	0	28	20.57	N	141	17.97	W		224	6.1		13649
1747	4858	4056	9	28	19.53	N	141	19.39	W		228	6.1		13752
1751														~13800 WP# 128
1800	4821	4056	3	28	18.69	N	141	20.56	W		235	5.2		13832 c/s 4 clicks.
1817	4862	4055	1	28	17.95	N	141	21.75	W		225	4.0		13938
1830	4919	4055	7	28	17.47	N	141	22.48	W		246	4.2		14007
1845	4909	4053	7	28	16.86	N	141	23.35	W		234	4.2		14097
1900	4876	4053	2	28	16.19	N	141	24.25	W		231	4.6		14188 EOL H20-13 c/s 8 clicks.
1902														14189 BOL H20-14 Tape 2
1908														WP# 127 c/c ″
1915	4846	4051	0	28	15.10	N	141	25.64	W		228	7.4		14270
1930	4861	4048	4	28	13.85	N	141	27.25	W		230	7.9		14357
1940														Question about SCS being recorded!
1947	4940	4044	4	28	12.54	N	141	28.11	W		229	7.6		
1953	4915	4041	9	28	11.96	N	141	28.78	W					WP# 126 c/c 219°
1955														WP# 125 c/c 237°
2000	4850	4039	4	28	11.42	N	141	30.59	W		237	7.7		
2026														NO SCS DATA RECORDED UP TO THIS POINT!
2030	4897	4032	2	28	09.20	N	141	34.42	W		239	8.0		
2045	4907	4029	2	28	08.23	N	141	35.15	W		230	7.9		QUIET ON WATCH
2106	4894	4028	5	28	7.22		141	37.47			236	7.7		14896
2115	4876	4029	2	28	6.17		141	39.71			225	7.8		14986
2130	4833	4030	4	28	5.03		141	41.37			234	7.6		15076
2145	4831	4030	3	28	3.92		141	43.09			231	7.1		15166
2200	4916	4027	4	28	2.82		141	44.73			233	7.6		15256
2215	4913	4023	3	28	1.83		141	46.55			233	8.0		15346
2229	4916	4021	8	28	1.24		141	47.60			234	7.6		15402 C/C 240° ATT WP # 124

S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: 02 — SHIP: ROGER REVELLE — DATE (DAY, MO. YR): — TIME ZONE (SHIP): — PAGE 16

CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof ✓ | MAG ✓ | GRAV | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts — COMMENTS AND OBSERVATIONS
2230	4967	4021	9	28	00.87	N	141	48.41	W		240	7.6		15436
2300	4946	4017	9	28	58.95		141	52.04			228	7.6		15616
2316	4956	4019	5	28	57.76		141	53.83			225	7.6		15712
2330	5010	4013	7	28	56.71		141	55.35			232	7.7		15796
2345	4919	4015	0	28	55.59		141	57.08			237	7.7		15886
0000	4919	4010	8	28	54.38		141	58.88			233	8.1		15983 JD 229 17 AUG 97
0017	4916	3919	7	27	53.16	N	142	00.68			240	8.5		16086
0030	4917	3919	3	27	52.06	N	142	02.28	W		242	8.2		16158
0047	4917	3919	7	27	50.84	N	142	04.23	W		233	8.0		16259
0100	5015	4010	2	27	49.96		142	05.82			242	7.4		16336 Gretchen on watch ~ ATT WP 123
0116	5011	4010	6	27	49.55		142	6.65			230	7.6		16371 c/s 062° ±122
0115	5021	4010	5	27	48.86		142	6.60			120	8.2		16426
0132	5013	4010	1	27	48.46		142	5.60						16471 C/C 055 C/S 12 knots
0130				27	49.37		142	04.13			55	12.0		16516
0145	5012	3999	0	27	50.92		142	01.62			58	10.8		16606
0200	4916	4000	1	27	52.56		141	58.84			59	13.1		16697
0215	4917	4001	4	27	54.39	N	141	55.83	W		51	11.4		16787 c/s 8 clicks "SITE 13 SURVEY BEGIN
0223	4919	4017	8	27	54.94		141	54.70			40	8.3		16836 c/c 090° LINE # 8 H20-14
0230	4906	4001	8	27	54.94		141	53.62			89	8.9		16877
0241	4912	4010	7	27	54.95		141	52.09			92	7.9		16945 Ralph starting to adjust GI Gun parameters
0245	4913	4011	7	27	54.95		141	51.46			82	8.5		16967
0300	4918	4010	9	27	54.99		141	49.15			90	8.5		17058 Ralph test complete GI Gun ie-set towing parameters
0315														
0328	4895	4022	3	27	55.00		141	44.81			67	8.7		17224 c/c EOL H20-14
0330	5010	4021	1	27	55.06		141	44.54			50	7.9		17237 Loaded SVP#06 for multi beam
0335				27	55.83		141	43.96						17254 STOP 1735 START BOL H20-15
0341	4918	4024	1	27	56.89		141	43.96			332	8.2		17324
0352	4993	4023	3	27	57.43		141	44.68			263	8.1		17370 course 270° Begin straight on H20-15
0400	4973	4024	4	27	57.41		141	45.83			271	7.6		17414
0415	4919	4024	9	27	57.41		141	48.00			271	7.9		17505
0430	4978	4022	0	27	57.38		141	50.18			272	7.5		17594
0445	4911	4020	6	27	57.35		141	52.52			272	7.8		17688
0501	4917	4021	5	27	57.38		141	54.57			273	7.6		17774 Ralph on watch - Clear + calm
														17789 EOL H20-15 c/c 0°
0502														Start analog filter tests.
0514														17857 stop H20-15 start H20-16
0520	4913	4013		27	55.05	N	141	55.84	W		150	7.9		17897

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S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: Ø2 — SHIP: REVELLE — PAGE 17
DATE (DAY, MO, YR): 18 AUG 97 JD 229 — TIME ZONE (SHIP): +9
CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof ✓ | MAG ✓ | GRAV | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	MIN	N/S	LONGITUDE DEG	MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ● kts — COMMENTS AND OBSERVATIONS
														19946 WP#5. C/C 090°
05 28														
05 30	4961.5	4020.5		27	59.75	N	141°	54.61	W		078°	6.8		19952
05 45	4944.9	4011.5		27	59.76	N	141	52.59	W		85°	7.5		19042
06 00	4939.9	4018.3		27	59.75	N	141°	50.44	W		87°	7.7		18132
06 15	4977.2	4021.9		27	59.75	N	141°	48.29	W		88°	7.9		18222
06 32	5001.2	4023.4		27	59.81	N	141	45.83			87	7.3		18332
06 37	5010													18356 WP#6 C/C 0°
06 47	4912.8	4025.7		28	00.45	N	141	44.04	W		6°	7.7		18418
06 48														#18420 stop 18421 start End of H20-16, BOL-H20-17
07 00	4953.3	4026.1		28	02.00	N	141	41.59	W		307	7.9		18490
07 03														18510 WP#7 C/C 270°
07 15	4898.8	4023.5		28	02.24	N	141	46.74	W		265	8.3		18580
07 30	4899.9	4022.5		28	02.18	N	141	49.07	W		267	8.1		18671
07 45	4926	4019.9		28	02.16	N	141	51.36	W		268	7.8		18760
08 00	4911.2	4020.8		28	02.17	N	141	53.63	W		269	7.7		18851
08 09														18904 WP#8 C/C 0°
08 15	4716.7	4023.3		28	02.40	N	141	55.83	W		321	7.7		18941
08 18														18960 stop End of H20-17, 18961 start H20-18
08 30	4913.4	4025.3		28	04.22	N	141	55.66	W		56°	7.4		19026
08 35														19057 WP#9 C/C 082°
08 45	4889.9	4022.6		28	04.73	N	141	53.63	W		86°	7.8		19116
09 00	4945	4020.7		28	4.95		141	51.49			89	7.3		19206
09 15	4930	4022.4		28	5.17		141	49.36			85	7.1		19295
09 30	4906.4	4024.1		28	5.41		141	47.23			81	7.7		19386
09 45	4775	4027.6		28	5.65		141	45.07			80	7.8		19475
09 46	4745	4028.0		28	5.67		141	44.92						19481 C/C to 180° WP # 10 EOL 18
09 53	4786	4030.0		28	5.01		141	44.03			177	7.8		19525 - Stop 19527 - Start Line 19
10 00	4783	4029.5		28	4.28		141	44.08			180°	8.0		19562
10 09	4908	4026.9		28	3.42		141	44.93			270	8.5		19617 C/C to 270° WP # 11 BOL 19
10 11	4926	4025.4		28	3.42		141	45.98			270	8.0		19653
10 30	4926	4023.6		28	3.42		141	48.16			270	8.1		19743
10 45	4952	4021.3		28	3.44		141	50.96			270	7.9		19833
11 00	4939	4019.9		28	3.47		141	52.76			270	7.9		19923
11 14	4928	4023.3		28	3.47		141	55.05			270	8.0		20009 C/C to 180° WP # 12 EOL 19
11 23					1.25			55.74						20058 - End run line 19 20052 - begin line 30
11 35	4912	4021.0		28	1.25		141	55.74			137	7.3		20131
11 41	4916	4020.6		28	1.01		141	55.00			90	7.6		20164 C/C to 90° WP # 13 BOL 20

GDC MARCH 1978 (rev DEC 1993)

S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: Ø2 — SHIP: REVELLE — PAGE 18
DATE (DAY, MO, YR): 17 Aug 97 JD 229 — TIME ZONE (SHIP): +9
CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof ✓ | MAG ✓ | GRAV ✓ | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	MIN	N/S	LONGITUDE DEG	MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ● kts — COMMENTS AND OBSERVATIONS
11 45	4915.6	4021.7		28	1.00	N	141	54.96	W		90	6.7		20191
12 00	4919.9	4018.2		28	00.94		141	52.40			90	7.8		20281
12 15	4916.2	4018.1		28	00.90		141	50.27			90	8.0		20371
12 30	4964	4021.4		28	00.92		141	48.13			87	7.9		20461
12 45	4958.3	4021.8		28	00.97		141	45.94			91	7.5		20551 LINE 20
12 53	5001.1	4021.4.5		28	01.00		141	44.77			103	7.3		20598 C/C EOL 20 GREAUES ON WATCH JD 229 17 Aug 97 WP 14
12 58				28	00.72		141	44.13						20627 STOP 20628 START CANG TO H20-LINE 21
13 00	4914.1	4021.6.3		28	00.49		141	44.00			175	7.6		20637 IN TURN
13 15	4915.3	4021.4.8		27	58.60		141	44.58			250	7.6		20727 BOL 21 WP 15 C/C 270°
13 30	4918.3	4021.4.1		27	58.61		141	46.58			258	8.1		20818
13 45	4979	4021.1.6		27	58.60		141	49.22			270	8.3		20909
14 00	4985	4018.5.8		27	58.58		141	51.71			278	8.5		21000
14 15	4954	4020.4.7		27	58.62		141	53.90			258	8.8		21087
14 21	4925	4019.1.6		27	58.62		141	55.00						21129 C/180° WP 16 EOL 21
14 28				27	58.38		141	55.71			202	8.0		21157 STOP 21158 START C/LINE # H20-22
14 30	4921	4019.0		27	58.04		141	53.53			185	7.2		21176 IN TURN
14 45	5010.1	4018.0		27	56.19		141	53.98			128	6.1		21264 IN TURN
14 52	4927.7	4019.3		27	56.04		141	55.12			70	7.6		21306 C/90° WP 17 BOL 22
15 00	4913.4	4020.1		27	56.15		141	53.86			84	7.4		21358
15 15	4937.1	4019.9		27	56.22		141	51.86			85	8.3		21444
15 31	4937.6	4022.6		27	56.21		141	49.46			97	8.3		21544
15 45	4919.8	4023.1		27	56.17		141	47.47			87	7.5		21628
16 00	4958.0	4023.9		27	56.19		141	45.48			83	8.4		21714
16 03	5001.7	4024.6		27	56.20		141	44.90						21736 WP 18 EOL 22 C/C 260° C/S 12 KT
16 07				27	55.96		141	44.39			156	10.5		21753 STOP 21754 START C/LINE to H20-23
16 15	4918.8	4022.7		27	54.84		141	44.61			251	11.1		21800
16 30	4919.5	4018.0		27	54.16		141	47.79			259	11.6		21891 RALPH DECIDES TO RUN N-S LINE THEN PTS AT 12002 (JD 229) 1230 Z and 1345 Z
16 36				27	54.01		141	49.31			300	12.3		21928 C/C 22 KTS UP FOR NEW LINE (N)
16 43				27	54.53		141	50.30			359	9.2		21971 C/C 360 C/S 8 KT BOL H20-23 WP 19
16 45	4972.2	4018.2		27	55.18		141	50.45			357	8.7		21981
17 00	4976	4021.4		27	57.26		141	50.56			357	8.7		22072 Ralph on watch - Clear calm
17 15	4956	4019.0		27	59.30		141	50.54			357	6.8		22161
17 30	4955	4019.2		28	01.31	N	141	50.48	W		354	8.1		22251
17 45	4937	4021.7		28	03.30	N	141	50.51	W		353	6.5		22341
18 00	4914.5	4022.2		28	05.32	N	141	50.54	W		001	9.0		22431
18 03														22450 C/C 16° C/S 12 KTS UP 18 EOL 23

GDC MARCH 1978 (rev DEC 1993)

S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: 02 — SHIP: REVELLE — CHECK OPERATIONS — PAGE 19

DATE (DAY, MO, YR): 17 AUG 97 JD 229 — TIME ZONE (SHIP): +9 — 12 kHz | 3.5 kHz ✓ | SEIS.Prof ✓ | MAG ✓ | GRAV ✓ | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ● kts	COMMENTS AND OBSERVATIONS
1815															22460 EOL H20-23 22461 BOL H20-24
1815	4919	4012		28	07.02	N	141	51.74	W		262	12.2			22521
1830	4889	4012		28	05.00	N	141	56.07	W		216	12.7			22611
1845	4719	4012		28	02.56	N	141	55.97	W		315	12.3			22700
1900	4939	4011		27	59.96	N	141	58.01	W		215	11.9			22795
1917	4957	4010		27	57.40	N	142	00.08	W		211	11.9			22894
1930	4891	4010		27	55.31	N	142	01.45	W		213	12.1			22971
2000	5052	4007		27	50.55	N	142	05.65	W		209	12.2			23153 ~~Sta 1~~
2005															23191 ATTWP #3122 c/c 237° c/s 8kts
2015	4997	4008		27	48.97	N	142	07.72	W		234	8.3			23241
2030	4997	4010		27	47.84	N	142	09.65	W		235	8.0			23331
2045	4944	4010		27	46.80	N	142	11.57	W		229	8.3			23421
2100	4849	4006		27	45.69		142	13.47			242	8.0			23510 Swift on watch.
2115	4834	4010		27	44.57		142	15.36			230	8.2			23601
2130	4811	4010		27	43.44		142	17.24			235	7.8			23690 ↓ blast plume
2145	4840	4010		27	42.34		142	19.13			234	8.2			23781 Noticed less of sharp gun pulse on oscilloscope
2149															23806 pulse back
2205	4891	4006		27	40.92		142	21.63			226	7.9			23900
2216	4941	2507		27	39.48		142	24.10			232	7.6			24024 WP 121 No C/C Mag values varying by +/-100,000
		4886													
2236	4956	3516		27	38.12		142	26.53			229	8.0			24050
2245	4938	4006		27	36.06		142	26.58			232	8.0			24141 Mag values stable again.
2310	4942	4010		27	37.01		142	28.41			232	7.7			24231
2311	4912	4010		27	35.96		142	30.27			239	7.6			24322
2330	4983	3914		27	34.83		142	32.28			234	7.8			24410 2337 - volc cone in most > 5000m depth
2346	4985	3914		27	33.75		142	34.07			233	7.7			24507
0010	4992	3212		27	32.67		142	35.90			231	7.9			24596 JD 230 Aug 18 Monday
0011	5496	4811		27	31.68		142	37.59			234	8.0			24681
0026	3010	3716		27	30.62		142	39.43			237	8.1			Jim turned 3.5 off (on ~1 min lost.
0030															24771
0045	4942	3232		27	29.58		142	41.27			233	7.7			24861
0057	4613	4151		27	28.74		142	42.33			228	7.7			24934 ~ ATT WP 120 GREATER ON WATCH
0110	4973	3913		27	27.52		142	43.90			234	7.7			25027
0115	4913	3516		27	27.53		142	44.94			238	7.4			25041
0130	4919	3419		27	26.42		142	46.94			226	7.9			25131
0145	4949	3137		27	25.36		142	48.71			226	8.2			25227
0200	4915	3817		27	24.38		142	50.41			241	7.7			25311

GDC MARCH 1978 (rev DEC 1993)

S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: 02 — SHIP: REVELLE — CHECK OPERATIONS — PAGE 20

DATE (DAY, MO, YR): 18 AUG 97 JD 230 — TIME ZONE (SHIP): +9 — 12 kHz | 3.5 kHz ✓ | SEIS.Prof ✓ | MAG ✓ | GRAV ✓ | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ● kts	COMMENTS AND OBSERVATIONS
~~0215~~	~~4994~~	~~3914~~		~~27~~	~~30.00~~	~~N~~	~~142~~	~~52.35~~	~~W~~						~~25461~~
0215	4901	3981		27	32.25		142	52.35			227	7.8			25401
0230	4918	3918		27	22.28		142	54.04			239	7.4			25491
0245	4910	3987		27	21.24		142	55.86			238	7.9			25581
0300	4911	3916		27	20.20		142	57.07			241	7.6			25671
0315	5049	3917		27	19.17		142	59.52			234	7.6			25761
0330	4902	3967		27	18.12		142	01.28			201	8.0			25851 AFTWP 119 = WP2 new line c/c 147°
0338	4916	3916		27	17.04		143	00.93			154	7.5			25907 STOP 25908 START C/LINE to H20-25
0345	4913	3969		27	16.54		143	00.53			138	7.7			25938
0346				27	16.44		143	00.43			113	7.5			25956 c/c 057°
0352	4915	3917		27	16.32		142	59.63			56	8.4			25984 BOL H20-25 WP2
0400	4918	3981		27	16.81		142	58.52			63	8.8			26028
0415	4912	3958		27	17.50		142	56.67			65	7.1			26118
0430	4814	3981		27	19.03		142	54.68			61	8.9			26209
0445	4944	3988		27	20.17		142	52.72			55	9.0			26298
0500	4986	3918		27	21.39	N	142	50.83	W		57	7.3			26392 WP3 c/c ~~330~~°
0515	4914	3918		27	23.24	N	142	50.48	W		334	8.6			26483
0530	5000	3917		27	24.43	N	142	52.26	W		287	7.9			26570
0533	4993	3991		27	24.39	N	142	52.45	W		240	7.6			WP4 c/c 237
0536															26606 Lost EOL H20-25 26607 BOL H20-26
0545	4911	3912		27	23.75	N	142	54.14	W		233	7.6			26657
0600	4918	3912		27	22.66	N	142	55.90	W		236	7.6			26747
0615	4936	3996		27	21.54	N	142	57.68	W		237	7.6			26838
0630	5018	3935		27	20.51	N	142	59.49	W		237	7.7			26927
0645	4916	3971		27	19.58	N	143	01.19	W		237	7.6			27017
0653															27072 WP5 c/c 150
0655															27076 EOL H20-26 27077 BOL H20-27
0700	4951	3962		27	18.40	N	143	02.56	W		182	7.6			27103
0715	4933	3964		27	16.90	N	143	04.40	W		108	8.0			27194
0728															27228 - WP6 c/c 057°
0730	4998	3971		27	17.69	N	142	59.43	W		56	8.11			27291
0745	5015	3983		27	18.76	N	142	57.55	W		57	8.1			27378
0800	4901	3957		27	19.86	N	142	55.64	W		57	8.0			27465
0815	4911	3914		27	20.97	N	142	53.8	W		56	8.0			27554
0830	4951	3916		27	22.07	N	142	51.95	W		57	8.01			27644
0841															~~27713~~ WP7 c/c 330°
0845															27715 EOL H20-27 27716 BOL H20-28

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S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: Ø2 — SHIP: REVELLE
DATE (DAY, MO. YR): 18 AUG 97 JD 230 — TIME ZONE (SHIP): +9
CHECK OPERATIONS — PAGE 21
12 kHz | 3.5 kHz ✓ | SEIS.Prof ✓ | MAG ✓ | GRAV | SeaBeam ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts COMMENTS AND OBSERVATIONS
0 0 1 4 5	4 1 9 9 6	3 9 8 5 9		27	23.60	N	142	50.976			355	7.6		27730
0 0 9 1 0 1 0	5 1 0 0 0	3 9 8 9 1 3		27	24.69	N	142	52.380			3 3 1	7.7		27821
0 0 9 1 1 1	5 1 0 1 0 1	3 9 9 3 1 6		27	25.50		142	53.58			234	8.3		27889 Swift on watch WP #8 Box 28
0 0 9 1 1 5	5 1 0 1 0 2	3 9 9 1 4 7		27	25.22		142	54.09			234	8.0		27909
0 0 9 1 3 0	5 1 0 1 4 4	3 9 9 1 6 4		27	24.10		142	55.99			237	7.9		27999
0 0 9 1 4 5	5 1 0 1 7 3	3 9 9 1 5 1 1		27	22.98		142	57.81			231	8.2		28089
1 1 0 1 0 0 1	5 1 0 1 7 1 1	3 9 8 1 8 1 0		27	21.88		142	59.68			235	7.8		28179 Stopped & SCS. EOL 28
1 0 2 2 6	4 1 9 1 9 8	3 9 1 7 1 4 2		27	14.76		143	02.56			194	4.5		Done securing gun + Streamer C/S to 12 kts
1 0 3 1 0	4 1 9 1 7 8	3 9 1 7 2 2 5		27	19.29		143	00.70			145	10.8		stopped recording 3.5 kHz
1 1 1 0 1 0	4 1 8 9 1 0	3 9 5 1 7 1 6		27	15.49		143	5.88			236	13.1		
1 1 1 2 6	4 1 8 1 1 4	3 9 1 5 1 6 7		27	13.09		143	9.97				13.2		C/C 250° ATT WP # 118
1 1 1 3 1 0	4 1 8 1 8 1 0	3 9 1 5 1 5 1 2		27	12.46		143	12.24			251	12.9		
1 2 1 0 1 0	4 1 8 1 2 6	3 9 1 5 1 4 1 3		27	10.19		143	14.32			248	13.4		
1 2 2 0 1 8	4 1 7 1 7 1 6	3 9 1 5 1 2 4		27	9.57		143	14.15			248	13.2		NO C/C ATT WP # 117
1 2 3 1 0	4 1 8 1 3 1 4	3 9 1 5 1 2 0		27	7.90		143	15.95			242	12.9		
1 2 1 4 1 5	4 1 9 1 6 1 3	3 1 8 1 6 1 9 8		27	06.83		143	15.42			249	13.2		CREATURES ON WATCH - NICE MOONLIGHT
1 3 1 0 1 0	4 1 7 1 8 1 7	3 1 9 1 5 1 1 8		27	05.86		143	17.90			246	13.1		8 Aug 97 JD 230 KIWI Ø2
1 3 3 1 0	4 1 8 1 4 1 3	3 1 9 1 3 2 0		27	03.52		143	19.80			252	12.9		~ ATT WP 116 CHNG CALCOMP / APR
1 4 0 1 0	4 1 9 2 1 6	3 1 9 1 5 0 1 2		27	01.28		143	16.51			245	13.4		
~~1 4 2 1 6~~														~ ~~ATT WP~~
1 4 1 3 0	4 1 7 1 9 1 7	3 1 9 1 5 1 1 3		26	58.36		143	13.62			233	13.3		~ ATT WP 115
1 5 0 1 0	4 1 7 1 7 1 4	3 1 9 1 5 1 4 1 7		26	55.20		143	19.68			239	12.8		~ ATT WP 114
1 5 3 1 0	4 1 7 1 7 1 6	3 1 9 1 3 1 4 8		26	51.93		144	06.21			244	13.5		
1 6 1 0 1 0	4 1 7 5 1 1	3 1 9 1 2 1 6 1 1		26	48.84		144	12.61			241	12.6		
1 6 3 0	4 1 8 9 1 1	3 1 9 1 1 9 0		26	46.03		144	18.69			243	12.0		
1 6 2 1 4	4 1 9 1 2 1 4	3 1 9 1 1 3 1 0		26	44.61		144	21.68			244	12.5		~ ATT WP 113
1 6 4 5	4 1 9 2 1 4	3 1 9 1 1 3 6		26	44.61		144	21.58			244	12.5		
1 7 0 0	4 8 3 1 5	3 1 9 0 7 1 6		26	43.16		144	24.68			242	12.3		Ralph on watch
1 7 0 1 5							144	25.89						ATT WP 112 - same course
1 7 2 5														Captain wants to test DP - mustering forces for mag
1 7 3 5	5 0 1 3 4	3 1 9 0 8 1 0		26	39.81		144	31.79			240	12.1		ATT WP 111 - pulling magnetometer
1 7 5 5														& starting DP tests
														↳ mag man board
1 9 2 0														mag back in water, 5 min. post WP 111 @ 12:26Z
1 9 4 0	5 1 0 1 5 1 4	3 1 9 0 1 5 1 4		26	37.31		144	36.96			239	12.2		
2 0 0 1 3	5 1 1 3 2	3 1 9 0 1 7 1 2		26	34.48		144	41.62			241	12.0		
2 0 3 0	5 1 1 3 1 3	3 1 9 1 1 2 9		26	32.48		144	46.86			242	12.4		

GDC MARCH 1978 (rev DEC 1993)

S.I.O. UNDERWAY WATCH LOG — CRUISE: KIWI — LEG: Ø2 — SHIP: REVELLE
DATE (DAY, MO. YR): 18 AUG 97 JD 230 — TIME ZONE (SHIP): +9
CHECK OPERATIONS — PAGE 22
12 kHz | 3.5 kHz ✓ | SEIS.Prof ~~✓~~ | MAG ✓ | GRAV | SeaBeam ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts COMMENTS AND OBSERVATIONS
2 1 0 0	5 1 2 3 1 8	3 9 1 1 4 1 6		26	30.08	N	144	52.88	W		262	12.2		
2 1 1 3 0	5 1 1 1 3 1 8	3 1 8 1 9 1 4 1 5		26	29.32		144	59.72			259	12.4		
2 2 1 0 1 0	5 1 1 1 9	3 1 7 1 3 1 0 1 6		26	28.21		145	6.83			256	12.3		
2 2 2 1 6	5 1 1 1 9 1 5	3 1 8 1 7 1 5 1 2		26	27.25		145	13.01			262	12.5		ATT WP # 109 NO C/C
2 2 3 1 0	5 1 1 5 1 2	3 1 5 1 1 1 6 1 2		26	27.14		145	13.70			260	12.7		
2 3 1 0 1 0	5 1 0 1 8 1 0	3 1 8 1 9 1 3 1 1		26	26.14		145	20.39			260	12.3		
2 3 3 1 0	5 1 1 3 1 9	3 1 3 7 1 4 1 5		26	25.07		145	27.31			260	12.4		2343 clogged Plotter paper
2 4 0 1 0	5 1 2 4 1 1	3 1 2 1 3 1 6 1 6		26	23.96		145	34.05			262	13.5		C/C 260° WP # 108 JD 231 19 Aug
0 0 0 1 2 2	5 1 1 1 8 4	3 1 2 1 3 1 3 1 0		26	23.16		145	38.31						C/C 256° WP # 107
0 0 1 0 3 5	5 1 1 1 6 1 8	3 1 3 1 8 1 9 1 2		26	22.53		145	42.24			256	12.3		
0 0 1 0 4 4	5 1 1 1 7 1 3	3 1 8 1 0 1 0 1 2		26	22.10		145	44.27				12.0		C/C 253° WP # 106
0 1 1 0 0	5 1 2 1 3 1 7	3 1 8 1 8 1 2 1 5		26	21.26		145	47.63			257	12.9		
0 1 1 3 0	5 1 0 1 8 4	3 1 8 1 7 1 5 1 0		26	19.31		145	54.78			249	12.8		
0 1 1 3 5	5 1 1 1 5 1 0	3 1 7 1 3 1 5 1 4		26	19.07		145	55.66			247	12.2		C/C 250 ATT WP 105
0 1 2 0 0	5 1 1 1 8 1 0	3 1 6 1 5 1 6 1 8		26	17.29		146	01.03			252	12.2		19 Aug 97 JD 231
0 1 2 3 0	5 1 1 1 8 1 9	3 1 8 1 6 1 8 1 8		26	15.33		146	07.98			243	12.3		← ~~ATT WP 104~~ (26°14.2N, 146°07.3W)
0 1 3 1 0	4 9 1 4 1 6	3 1 8 1 6 1 3 1 7		26	13.20		146	13.95			251	12.1		new SVP 07 entered to Seabeam
0 1 3 3 0	4 1 0 1 9 1 6	3 1 5 1 1 5 1 6		26	11.08		146	20.48			248	12.9		< ATT WP 103
0 1 4 0 0	4 9 1 0 1 6	3 1 3 1 4 1 8		26	09.17		146	26.83			251	12.6		
0 1 4 1 3 0	5 1 0 1 0 1 9	3 1 8 1 5 1 8 1 2		26	07.15		146	33.45			249	12.6		
0 1 4 4 6	5 1 1 1 0 1 3	3 1 8 1 5 1 5 1 4		26	5.93		146	37.34			255	12.7		C/C 255° WP # 102
0 1 5 1 0 0	5 1 1 1 6 1 7	3 1 8 1 5 1 1 9		26	05.31		146	40.22			255	12.4		Ralph on watch
0 1 5 3 1 0	5 1 2 1 2 1 7	3 1 8 1 5 2 8		26	03.76		146	46.93			255	12.6		
0 1 6 0 0	5 1 1 1 7 1 7	3 1 8 1 4 1 1 7		26	02.13		146	53.71			254	12.6		
0 1 6 1 5	5 1 2 1 2 1 3	3 1 7 1 7 1 1 4		26	01.17		146	57.26			254	12.6		WP # 101 C/C 255
0 1 6 3 0	5 1 2 1 3 1 4	3 1 8 1 4 1 5 1 4		26	00.35		147	00.41			252	12.4		
0 1 6 4 5	5 1 1 9 1 3	3 1 5 1 3 1 2 1 6		25	59.32		147	03.98			254	12.7		WP # 100 C/C 254
0 1 7 0 0	5 1 2 1 7 1 8	2 9 3 1 1 6		25	58.51		147	07.12			252	12.6		
0 1 7 1 3	5 1 2 1 4 4	2 5 4 3 1 6		25	58.30		147	08.03			260	12.8		WP # 99 C/C 261
0 1 7 3 0	5 1 1 1 4 1 4	2 1 5 0 8 1 9		25	57.51		147	13.67			261	12.6		
0 1 7 4 6	5 1 2 1 1 4	3 1 8 1 4 3 1 9		25	56.82		147	18.62			261	12.5		WP # 98 NO C/C
0 1 8 1 0	5 1 2 1 1 0	2 1 5 1 3 0 1 7		25	50.57		147	20.92			261	12.7		
0 1 8 3 0	5 1 3 1 9 1 1	3 1 5 1 1 9 1 6		25	55.42		147	27.79			260	12.6		
0 1 9 0 0	5 1 3 5 2	3 1 8 1 2 1 1 0		25	54.38		147	34.54			258	13.0		
0 1 9 2 0	5 1 3 0 1 7	3 1 7 1 6 1 0 1 3		25	53.73		147	39.72			261	13.0		C/C 260° WP # 97
0 1 9 3 0	5 1 2 1 3 1 9	3 1 0 1 9 1 1 1 8		25	53.35		147	42.05			259	13.1		
0 1 9 4 8	5 1 3 1 5 1 6			25	52.65		147	45.99			255	13.0		C/C 254 WP # 96

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S.I.O. UNDERWAY WATCH LOG — CRUISE: Kiwi — LEG: Ø2 — SHIP: Revelle — PAGE 23

DATE (DAY, MO, YR): 19 AUG 97 JD 231 — TIME ZONE (SHIP): +9 — CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG ✓ | GRAV | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts — COMMENTS AND OBSERVATIONS
1606	5336	4080		25	52.40	N	147	48.70	W		262	12.5		
1701	5336	3634		25	52.18		147	50.98			261	12.2		c/c 261° WP #95
1801	5342	4912		25	52.98		147	52.34			270	12.1		c/c 268 WP #94
1903	5340	3376		25	51.81		147	56.26			271	12.6		
2010	5331	3169		25	51.72		148	2.50			269	12.6		
2112	5341	3210		25	51.97		148	9.95			263	12.5		
2218	5337	3514		25	51.76		148	13.44			258	13.1		c/c 255° WP #93
2300	5337	4482		25	50.74		148	16.22			256	12.7		1216 changed Scale on 3.5 to 5000 - 6000m
2330	5331	4812		25	49.14		148	23.16			255	12.2		
2400	5337	5011		25	47.53		148	29.43			255	12.2		
2423	5219	4858		25	46.15		148	34.96			257	12.1		c/c 256° ATTWP 92 GREASES ON WATCH
2431	5324	4971		25	45.71		148	36.71			253	12.4		
2500	5345	3212		25	44.31		148	42.98			252	13.1		
2530	5285	3689		25	42.56		148	50.34			253	12.3		
2600	5313	3589		25	40.85		148	56.15			245	12.6		c/c 245° ~ ATTWP 91 & ~ ATTWP 90
2630	5331	3585		25	38.13		149	02.06			244	12.4		c/c 259° ~ ATTWP 89
2700	5401	5178		25	38.80		149	08.73			258	12.5		19 Aug 97 JD 231 / change pap on Calcomp
2730	5421	3786		25	35.64		149	15.66			275	12.0		c/c 279° ~ ATTWP WP 87 Changed ATTWP 88
2743	5406	3517		25	35.91		149	18.80			258	12.5		c/c 248 ~ ATTWP WP 88
2802	5404	—		25	34.59		149	22.92			282	12.5		c/c 280 MAG OFFLINE - ATTWP 86
2730	5439	3761		25	35.29		149	29.36			275	12.5		
2801	5351	3794		25	35.90		149	35.01			275	12.6		ATTWP 88 ~~ATTWP 85~~
2815	5391	3796		25	36.06		149	37.57			276	7.7		slow to change generators ATTWP 85 no c/c
2832	5421	3810		25	36.51		149	42.79			276	12.4		
2900	5341	3771		25	37.04		149	49.01			276	12.6		
2940	5495	3786		25	37.87		149	58.35			275	12.7		ATTWP 84
3001	5404	3791		25	38.29		150	02.90			276	12.4		
3015														change scale on GRAPHICS RECORDER to 6-8 sec
3036	5346	3795		25	36.92		150	09.39			275	12.5		
3101	5485	3763		25	39.50		150	10.00			275	12.2		
3117	5378	3657		25	39.88		150	19.97			276	11.9		ATTWP 83 c/c 274°
3125	5416	3591		25	39.99		150	21.51			273	11.9		ATTWP 82 c/c 275°
3205	5343	3774		25	40.71		150	30.23			273	11.9		Swift on watch.
3230	5441	3777		25	41.07		150	35.78			276	12.4		
3251	5512	3774		25	41.37		150	40.78			270	12.5		c/c 251 WP 81
3300	5472	3773		25	40.83		150	43.02			256	12.8		
3311	5416	3711		25	40.07		150	45.69			248	12.5		c/c 245 WP 80

GDC MARCH 1978 (rev DEC 1993)

S.I.O. UNDERWAY WATCH LOG — CRUISE: Kiwi — LEG: Ø2 — SHIP: Revelle — PAGE 24

DATE (DAY, MO, YR): 19 - Aug - 97 — TIME ZONE (SHIP): ~~+9~~ +10 — CHECK OPERATIONS: 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG ✓ | GRAV | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	ON CSE ____ ● ____ kts — COMMENTS AND OBSERVATIONS
2330	5511	3712		25	38.67	N	150	49.36	W		247	12.7		
2340	5407	3710		25	37.83		150	51.28			252	12.9		c/c 253° WP #79
2401	5458	3710		25	36.57		150	54.53			253	12.7		c/c 251 WP #78 20-AUG-97 JD 232
2430	5493	3717		25	34.66		151	2.58			249	13.1		Fire + boat drill 0047 changed platter pages
2450	5477	3761		25	32.98		151	7.10			240	12.7		c/c 241 WP #76
2503	5515	3759		25	31.68		151	9.97			242	12.4		
2511	5414	3761		25	30.15		151	12.82			239	12.7		c/c 246° WP #75
2534	5416	3761		25	28.63		151	16.15			249	12.9		
2600	5505	3762		25	26.47		151	21.42			247	12.3		20 Aug 97 JD 232 GREASES on watch
2623	5510	3792		25	23.91		151	27.90			245	12.2		
2710	5414	3759		25	21.36		151	34.08			245	12.4		423 nm to Honolulu ATTWP 74
2730	5419	3717		25	20.96		151	35.10			244	12.3		c/c 243
2733	5414	3816		25	18.33		151	40.72			245	12.5		
2800	5501	3741		25	15.706		151	46.44			249	12.5		change calcomp pages ← ATTWP 73
2833	5516	3741		25	14.28		151	52.81			330	12.4		c/c 12
2838	5516	3721		25	14.95		151	53.55						c/c 290° (ship WP 111) - ATTWP 72
														New WP # ← ATTWP 71
2850	5414	3749		25	16.41		151	58.67			292	12.1		
2852	5446	3676		25	18.19		152	04.07						c/c 237° ship WP 113 / ATTWP 70
2919	5411	3616		25	16.01		152	07.66			228	11.8		c/c 227 ship WP 114 / ATTWP 69
2940	5412	3546		25	14.51		152	09.41			226	11.9		Ralph on watch - calm
3011	5361	3652		25	12.84		152	11.31			217	12.0		ATTWP #68 c/c 217
3030	5437	3616		25	10.19		152	13.56			217	11.8		
3100	5535	3726		25	05.38		152	17.39			215	11.8		- light drizzle
3123	4383	3605		25	01.48		152	20.94			229	11.6		ATTWP #67 c/c 246
														1200m high seamount with caldera
3180	5512	3516		24	58.65		152	27.91			244	11.9		
3230	5116	3657		24	56.26		152	33.79			248	11.7		
3300	5381	3717		24	53.88		152	39.71			245	12.0		
3319	5313	3711		24	51.89		152	42.31			262	12		U ATTWP #66 c/c 266
3330	5317	3658		24	52.68		152	45.74			265	11.7		
3343	5371	3709		24	52.48		152	47.88			260	11.7		ATTWP #65 c/c 255
3400	5216	3511		24	51.37		152	52.65			252	11.9		Swift on watch
3430	5391	3512		24	49.44		152	58.45			257	12.2		
3510	5214	3717		24	48.33		153	4.48			256	11.9		
3530	5217	3616		24	46.94		153	11.21			256	11.8		
3604	5212	3518		24	45.36		153	18.04			256	11.5		

GDC MARCH 1978 (rev DEC 1993)

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S.I.O. UNDERWAY WATCH LOG | CRUISE: KIWI 02 | LEG: 02 | SHIP: REVELLE | CHECK OPERATIONS | PAGE 25

DATE (DAY, MO, YR): 20-AUG-97 (JD 232) | TIME ZONE (SHIP): +10 | 12 kHz | 3.5 kHz ✓ | SEIS.Prof | MAG ✓ | GRAV | SeaB ✓

TIME GMT	DEPTH (meters)	MAGNETICS	TIME	LATITUDE DEG	LATITUDE MIN	N/S	LONGITUDE DEG	LONGITUDE MIN	E/W	COURSE/SPEED CHANGE TIME	CSE GYRO	SPD KNOT	CODE	COMMENTS AND OBSERVATIONS
1123 11	5123 9	3165 5 2		24	43.94	W	153	23.56	W		256	11.6		
1130 10	5121 8	3165 7 5		24	42.12		153	29.27			252	11.7		
1135 14	5121 9	3165 5 9		24	41.92		153	30.28			250	11.6		C/C 252 WP #63
1133 10	5119 5	3165 8 10		24	40.37		153	35.41			251	12.5		Changed calcomp chart paper
1135 11	5115 2	3160 8 4		24	38.92		153	40.58			254	12.1		c/c scale on 3.5 KHz to 4500 - 5500 — GREENWICH
1140 10	5112 5	3165 4 4		24	38.52		153	41.11			252	13.0		21 Aug 97 (JD 232) overcast wet WATCH
1141 31	5114 10	3158 7 8 1		24	36.44		153	46.08			253	12.5		
1149 10	5057 1	3162 5 5 5		24	33.91		153	50.81				12.1		C/C 248° ATTWP 62 (24° 35.90, -153° 50.8)
1150 10	5096	3162 6 7		24	33.98		153	52.84			249	12.2		
1153 11	5091 7	3151 9 0		24	31.06		154	00.95			240	11.9		
1154 12	5076	3168 4 4		24	30.04		154	03.14			235	12.4		C/C 229° ATTWP 61 (24° 30.00, 154° 3.20)
1160 10	4964	3165 3 7		24	27.78		154	06.58			235	12.5		21 Aug 92 JD 232
1161 14	4970	3168 4 6		24	26.10		154	08.89			227	12.7		C/C 230° ATTWP 60 (24° 26.10, 154° 8.50)
1163 13	4964	3168 5 4		24	23.44		154	12.05			225	12.5		< ATTWP 59 (24° 22.20, 154° 12.50')
1170 11	4756	3168 3 2		24	19.40	N	154	16.04	W		224	12.3		
1170 8	4863	3165 6 4		24	18.22		154	17.86			237	12.8		C/C 235° ATTWP 58 (24° 18.20, 154° 17.90)
1173 2	4832	3165 6 4		24	15.39		154	22.15			231	12.8		K? WP 57 ATTWP 57 (24° 17, 154° 20') + WP 56
1180 10	4856	3167 6 5		24	11.81		154	27.36			234	12.8		Ralph on watch - light rain
1181 6	4829	3167 4 8		24	10.93		154	28.68			233	12.9		ATT WP #55 C/C 229
1181 11	4811	3165 3 4		24	10.26		154	29.63			235	12.9		ATT WP #54 C/C 240
1183 0	4787	3154 6 6		24	08.28		154	33.52			238	13.2		~~C/C~~
1191 16	4435	3160 9 4		24	03.25		154	42.68			239	12.9		ATT WP # 53 C/C 225.
1193 17	4574	3166 4 2		24	00.09		154	46.40			234	12.7		ATT WP #52 C/C 245
2001 0	4599	3165 9 3		23	57.93		154	51.19			244	12.8		
2010 14														change scale on graphic recorder 5-7 sec
2010 16														Bathy 2000 - rebooting
2011 0														" - back-up.
2013 0	4402	3657 1		23	55.31		154	57.57			240	13.0		
2111 1	4481	3653 5		23	51.56		155	06.12			233	12.6		ATT WP #51 C/C 207
														- End of cable survey
2146														mag aboard, all clear on foul tail
														SCIENCE WATCH SECURED
2216														3.5 OFF

ODC MARCH 1978 (rev DEC 1993)

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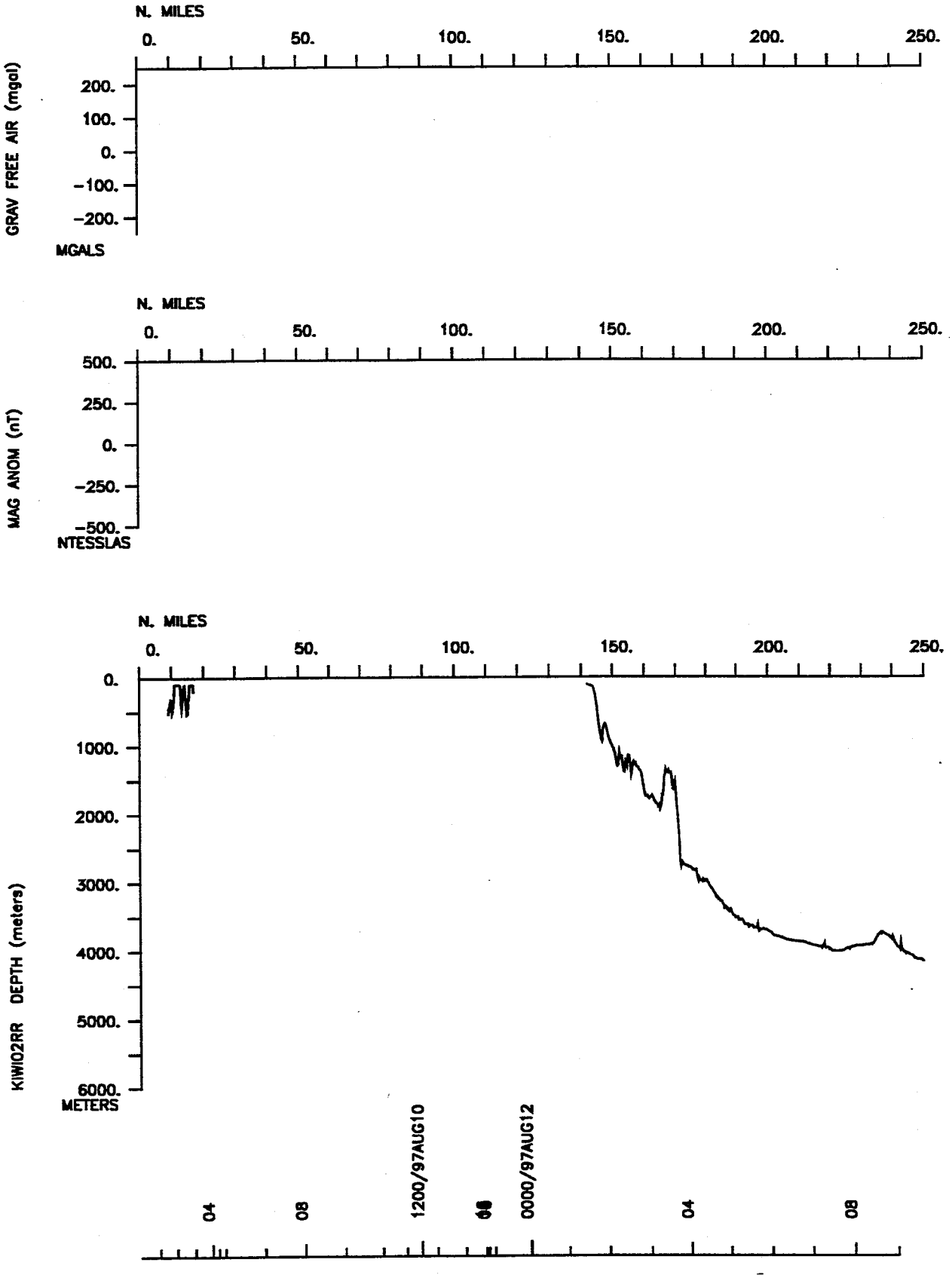
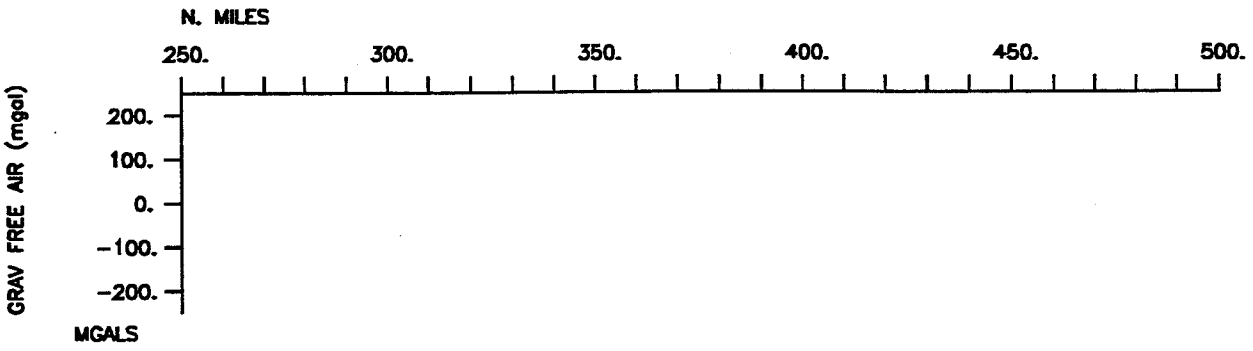
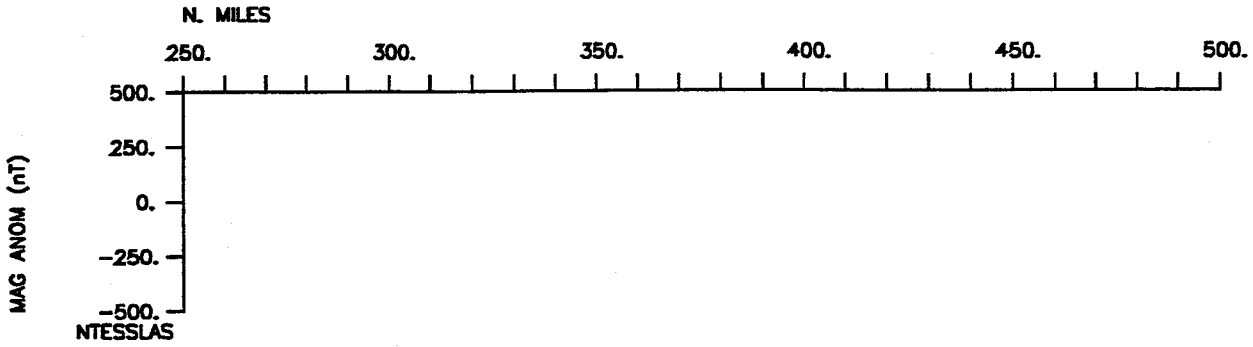
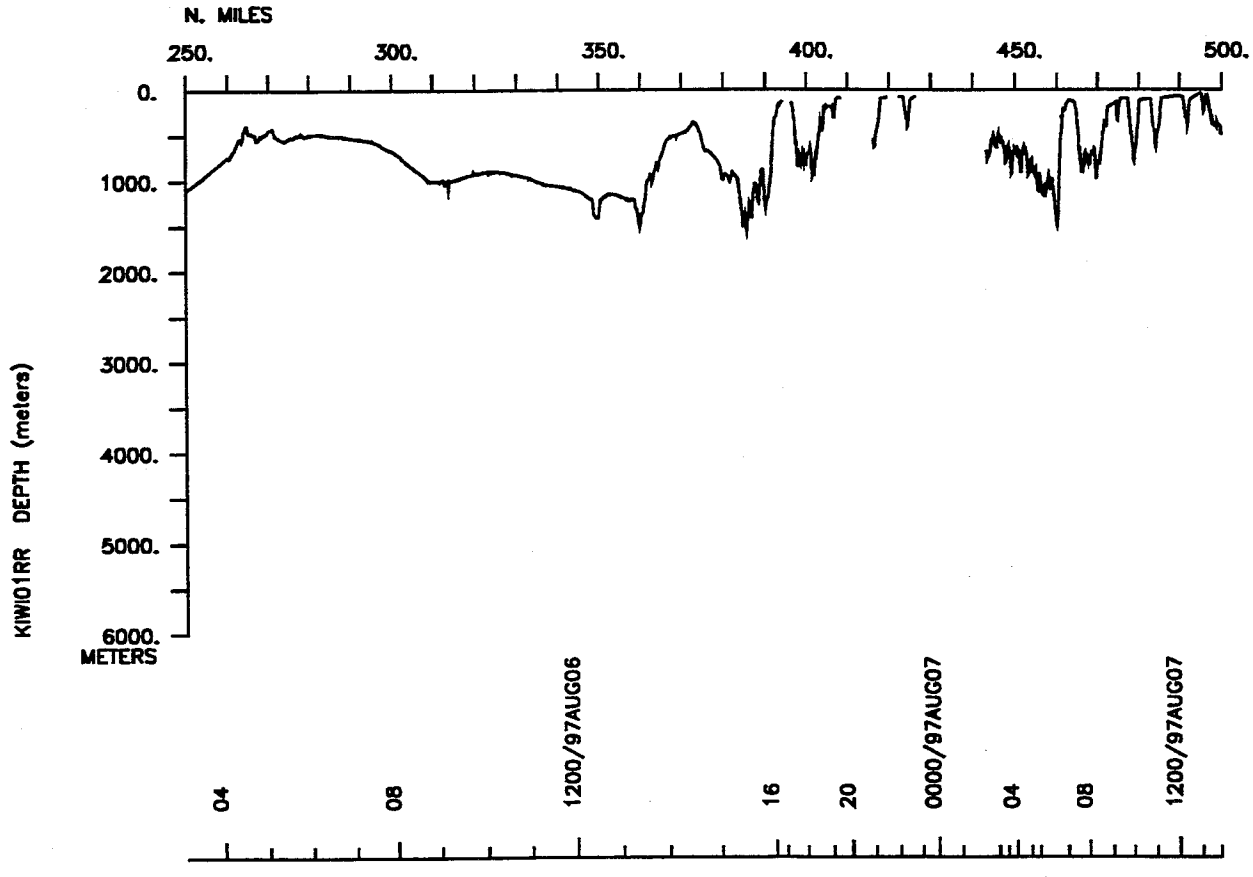
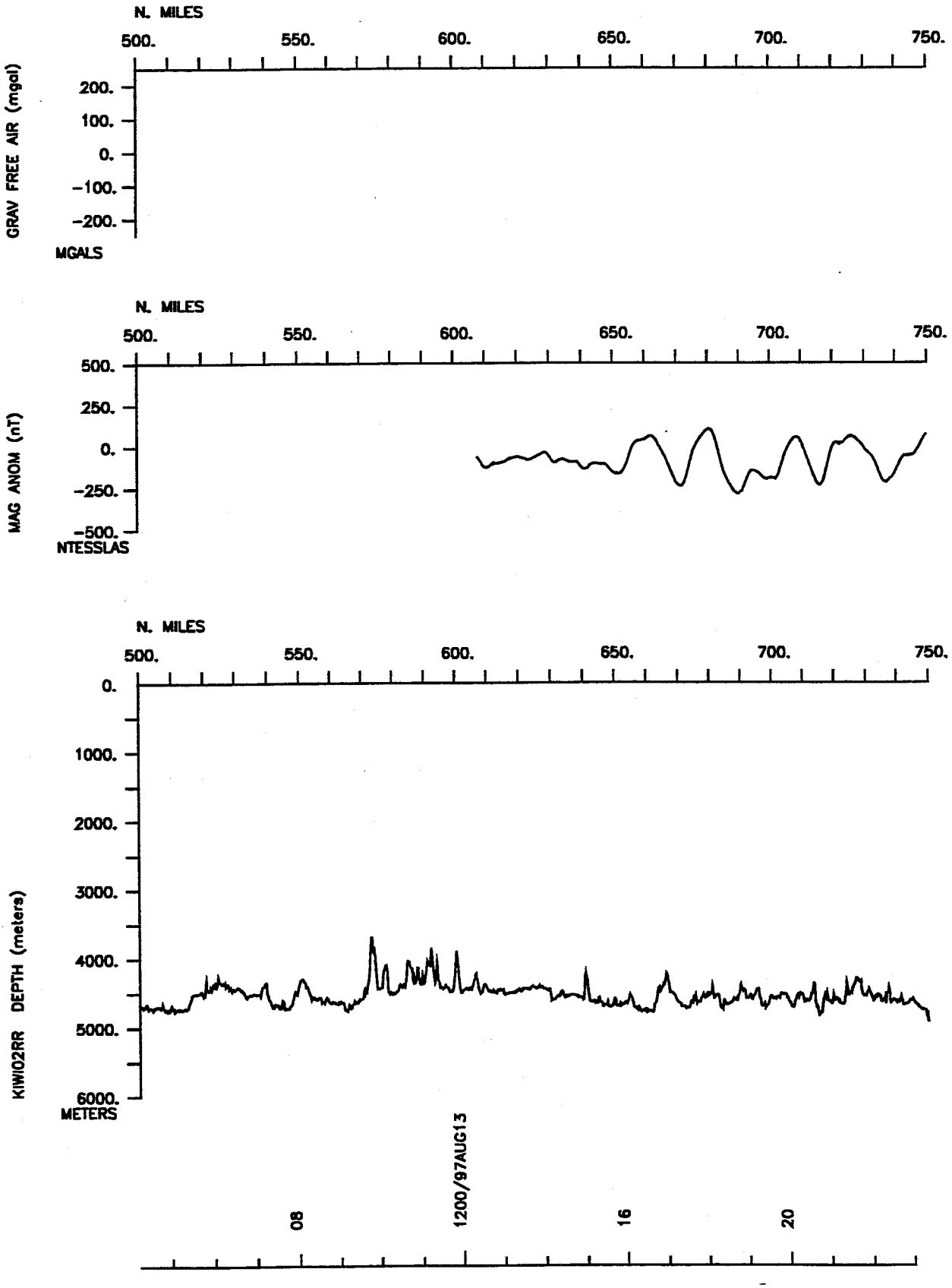
Appendix C: Daily Geophysical Data Summaries

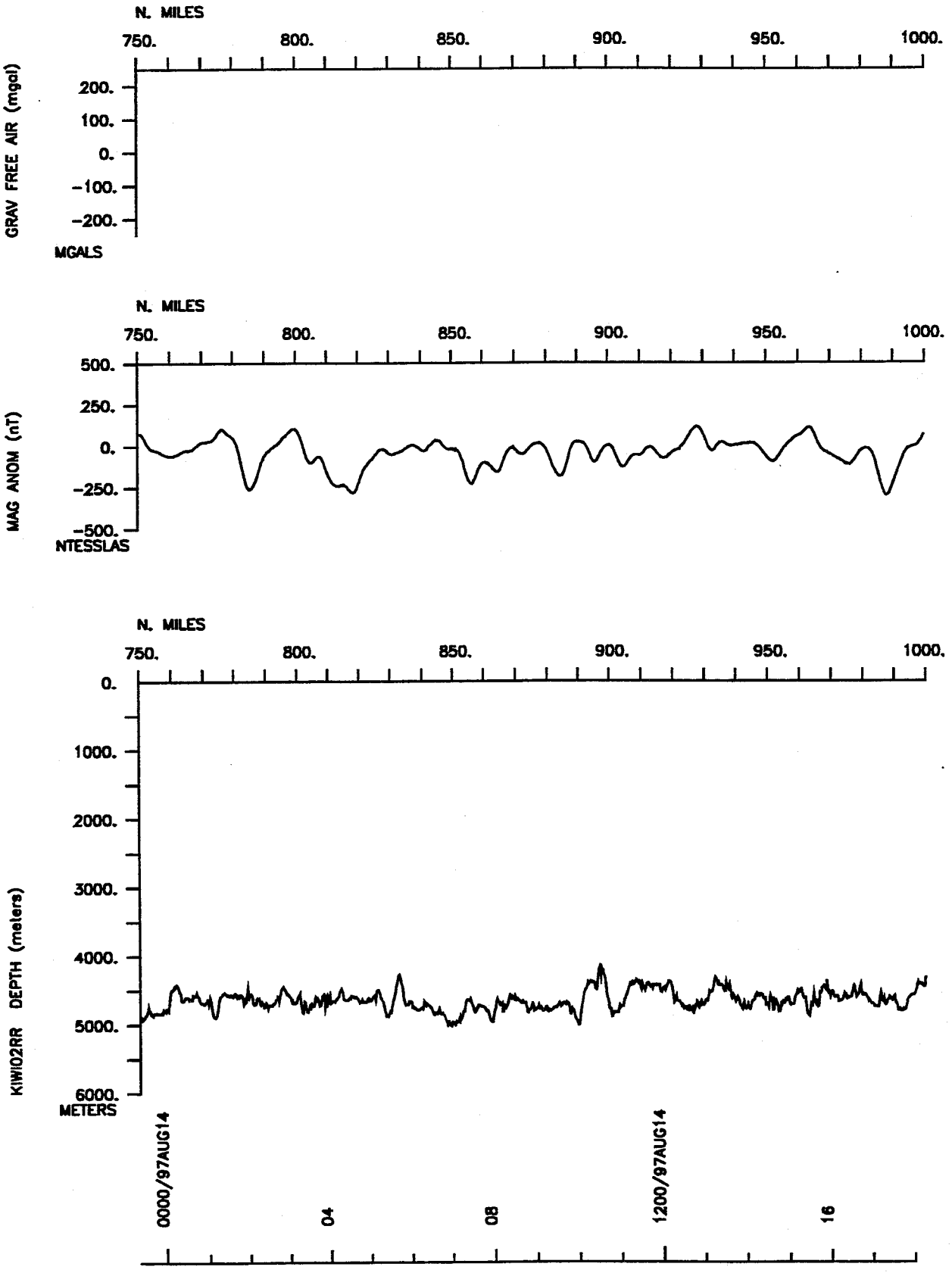

N. MILES
0.
50.
100.
150.
200.
250.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS
N. MILES
0.
50.
100.
150.
200.
250.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS
N. MILES
0.
50.
100.
150.
200.
250.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
04
08
1200/97AUG10
0000/97AUG12
04
08

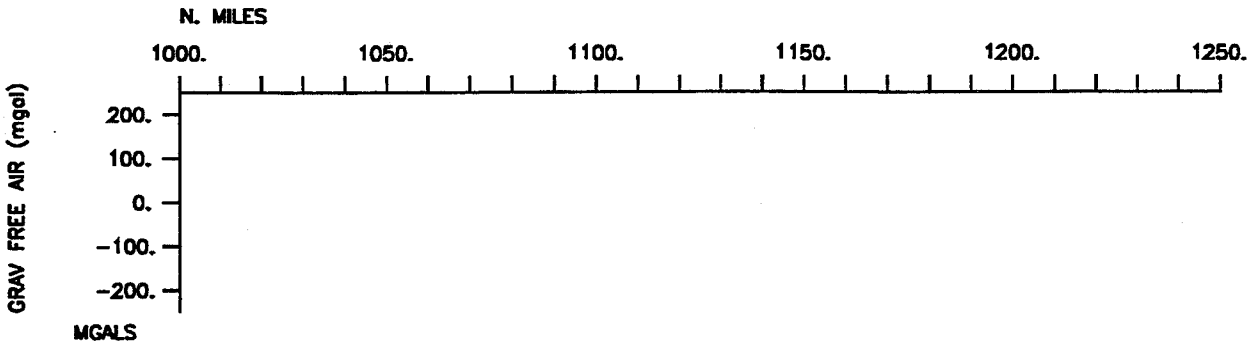

N. MILES
250.
300.
350.
400.
450.
500.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS

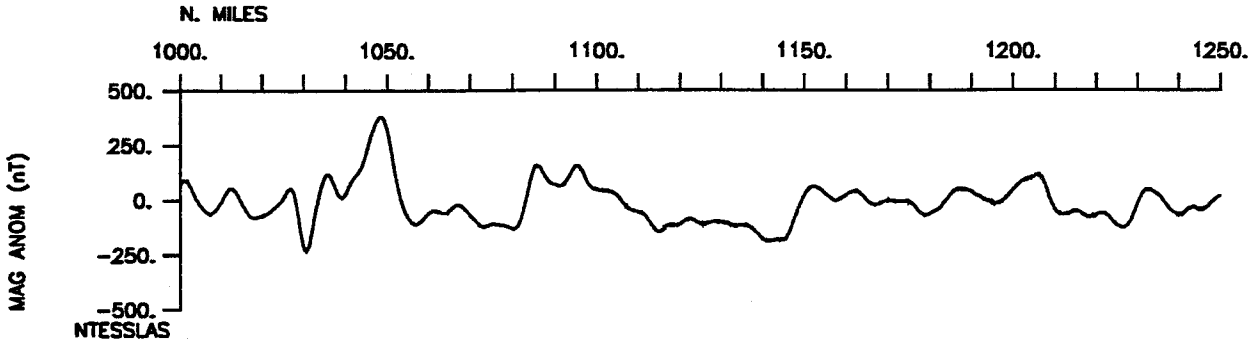

N. MILES
250.
300.
350.
400.
450.
500.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS

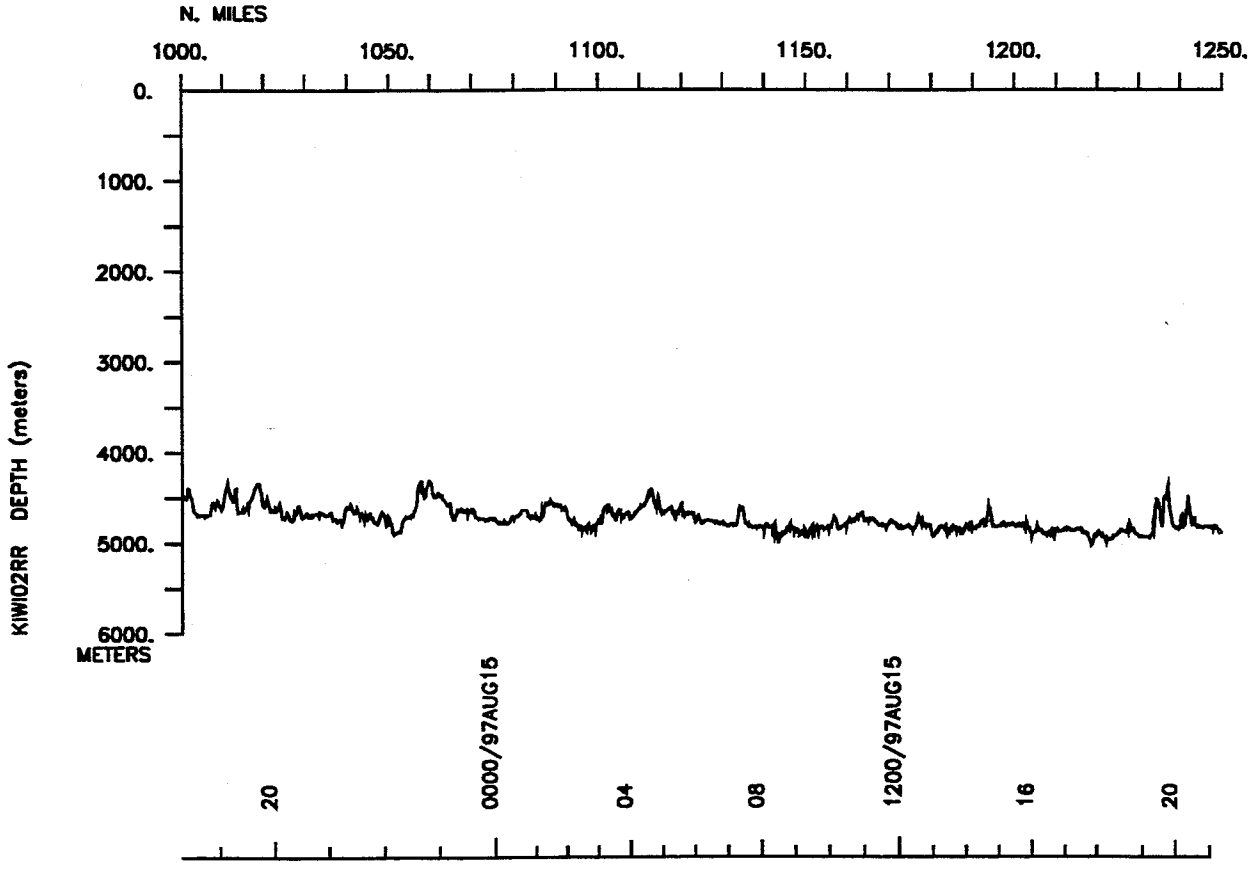

N. MILES
250.
300.
350.
400.
450.
500.
KIWI01RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
04
08
1200/97AUG06
16
20
0000/97AUG07
04
08
1200/97AUG07

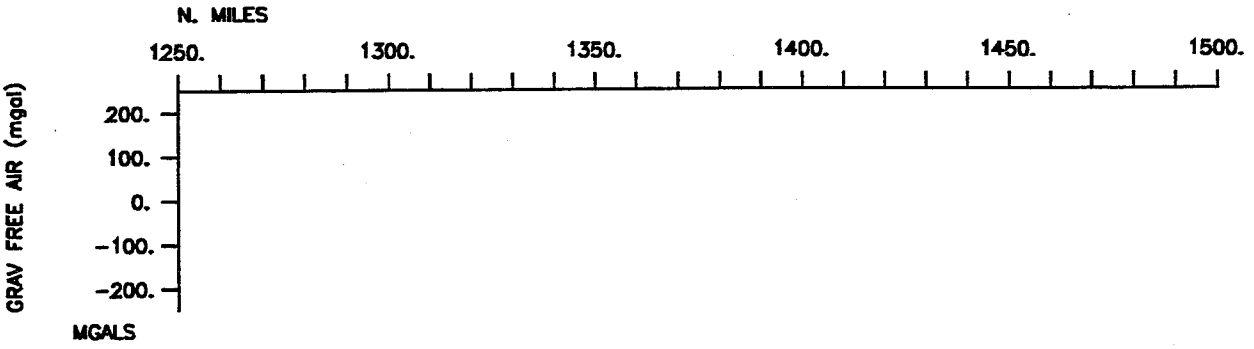

N. MILES
500.
550.
600.
650.
700.
750.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS
N. MILES
500.
550.
600.
650.
700.
750.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS
N. MILES
500.
550.
600.
650.
700.
750.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
08
1200/97AUG13
16
20

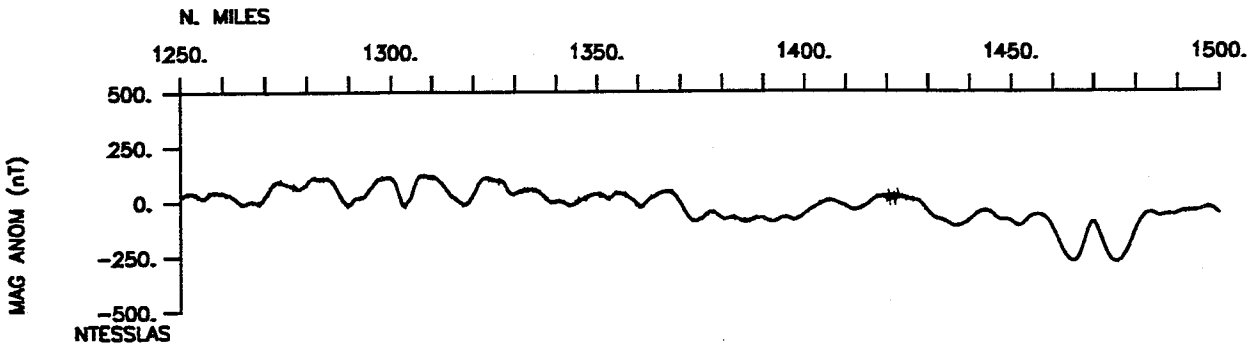

N. MILES
750.
800.
850.
900.
950.
1000.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS
N. MILES
750.
800.
850.
900.
950.
1000.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS
N. MILES
750.
800.
850.
900.
950.
1000.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
0000/97AUG14
04
08
1200/97AUG14
16

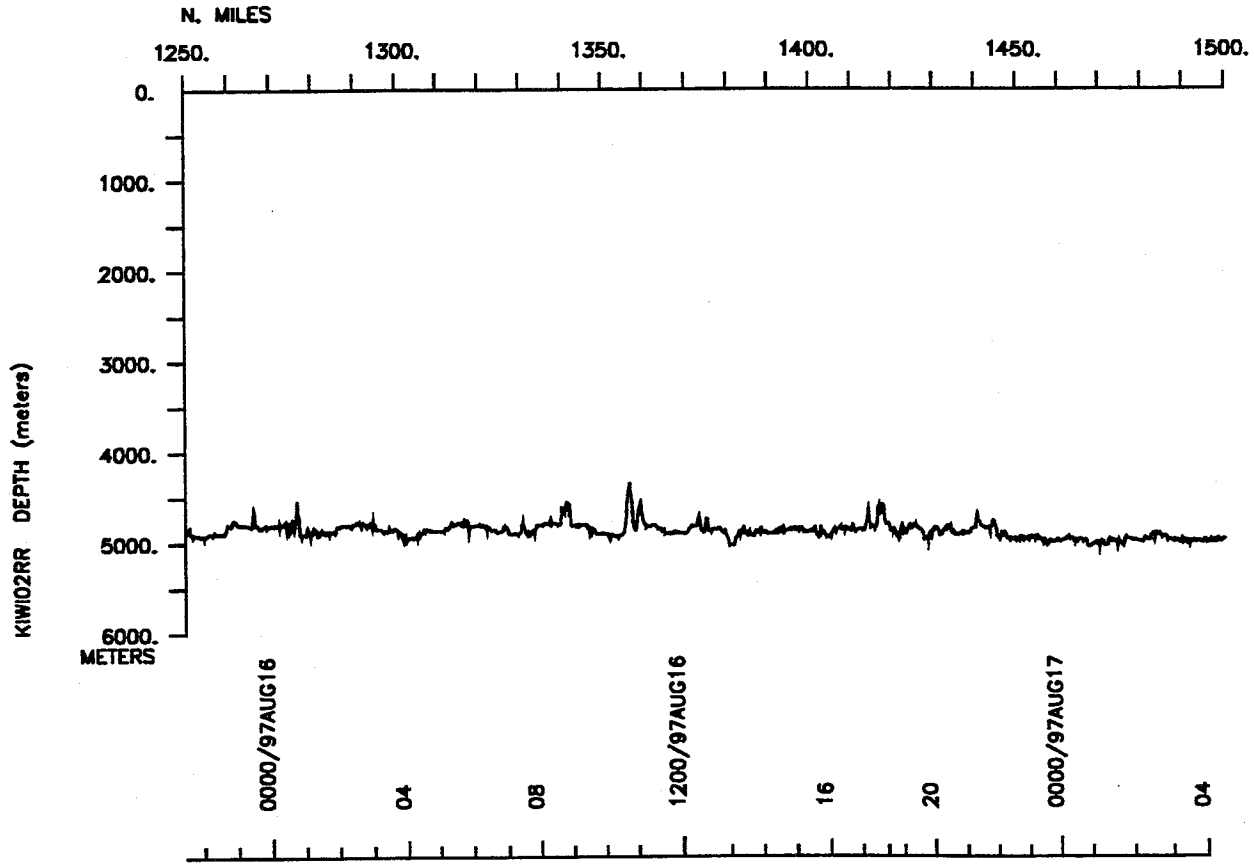

N. MILES
1000.
1050.
1100.
1150.
1200.
1250.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS

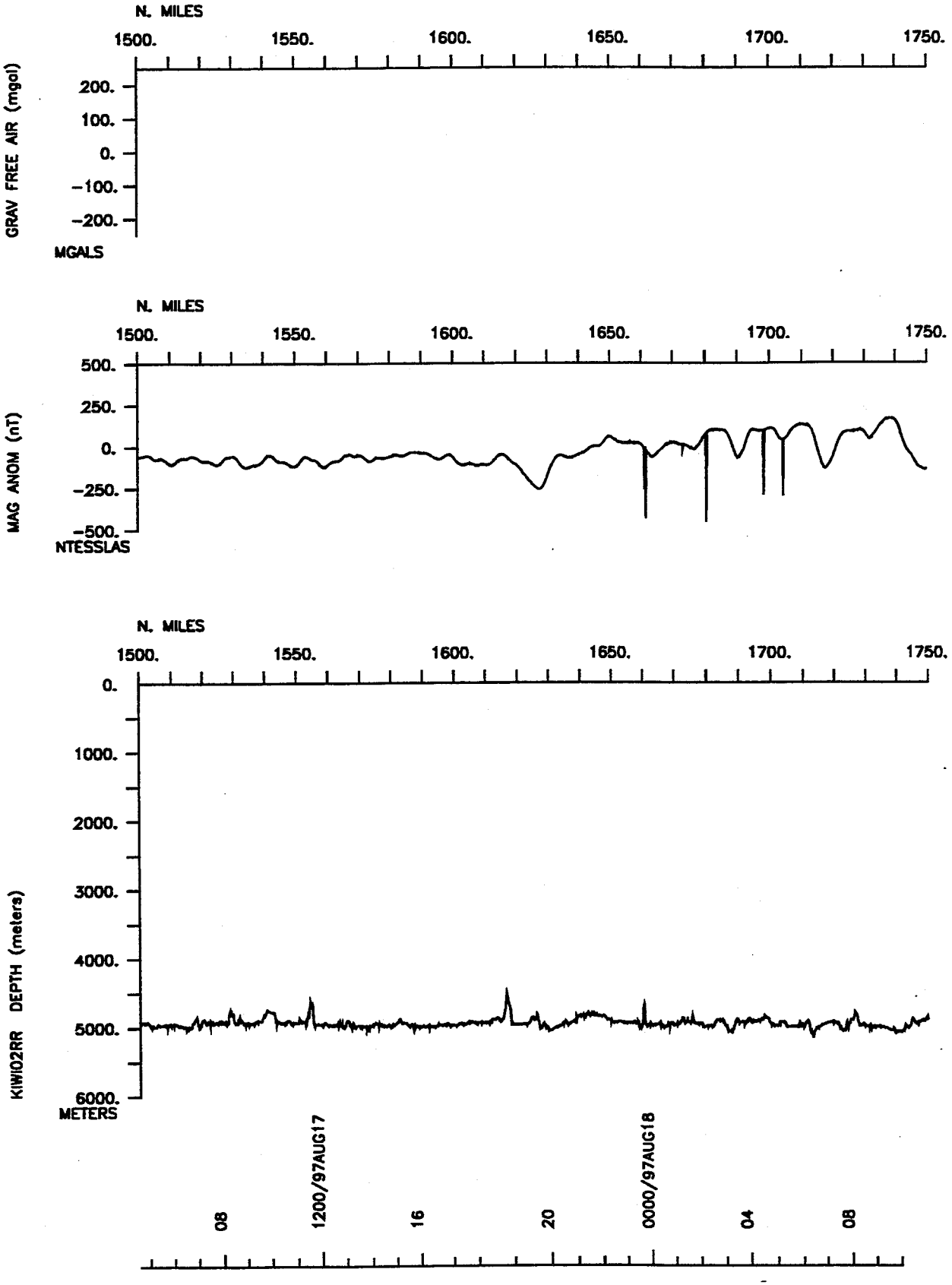

N. MILES
1000.
1050.
1100.
1150.
1200.
1250.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS

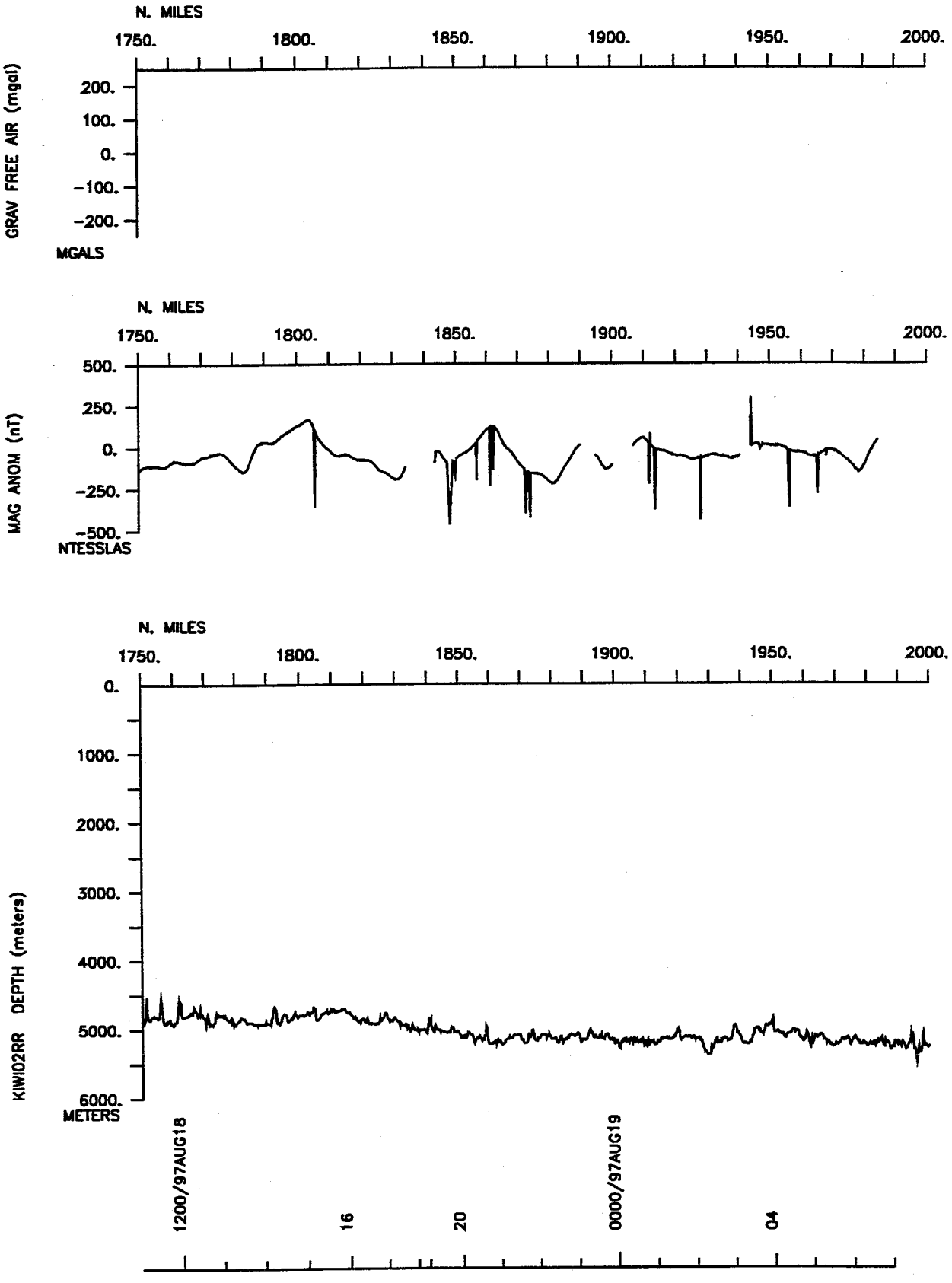

N. MILES
1000.
1050.
1100.
1150.
1200.
1250.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
20
0000/97AUG15
04
08
1200/97AUG15
16
20

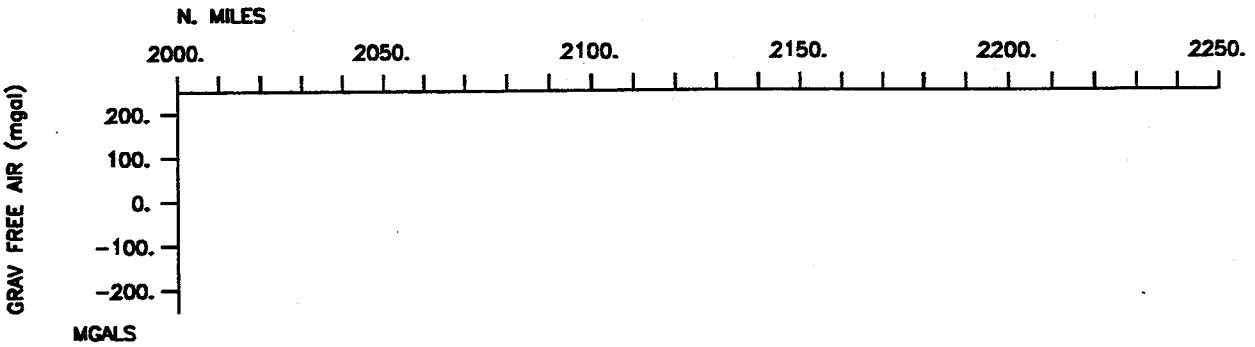

N. MILES
1250.
1300.
1350.
1400.
1450.
1500.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS


N. MILES
1250.
1300.
1350.
1400.
1450.
1500.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS

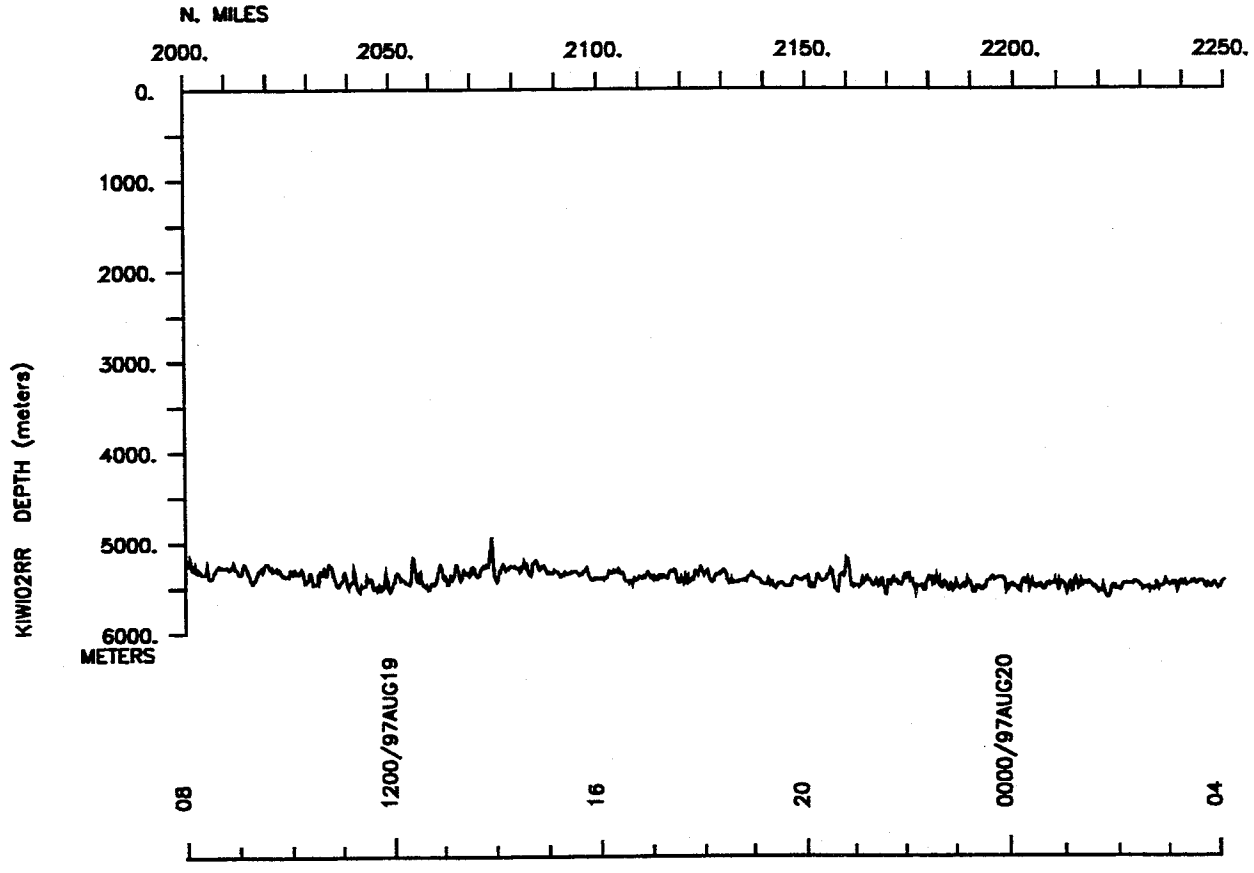

N. MILES
1250.
1300.
1350.
1400.
1450.
1500.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
0000/97AUG16
04
08
1200/97AUG16
16
20
0000/97AUG17
04

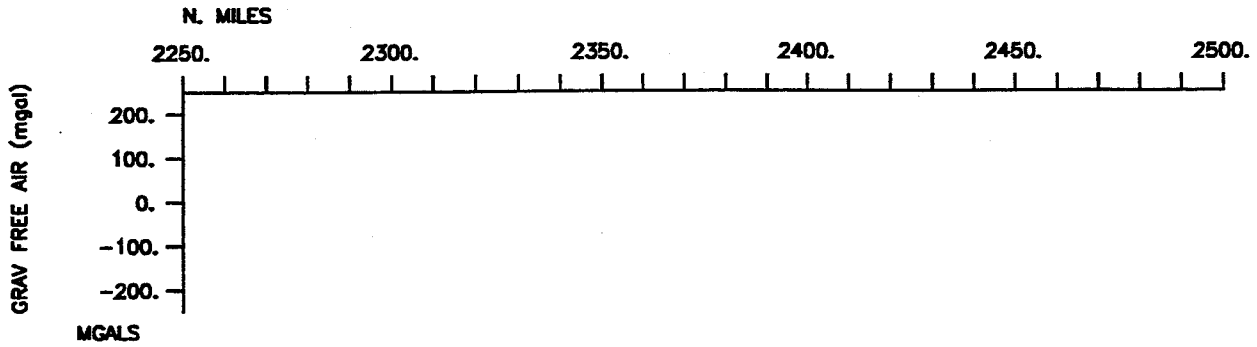

N. MILES
1500.
1550.
1600.
1650.
1700.
1750.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS
N. MILES
1500.
1550.
1600.
1650.
1700.
1750.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS
N. MILES
1500.
1550.
1600.
1650.
1700.
1750.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
08
1200/97AUG17
16
20
0000/97AUG18
04
08

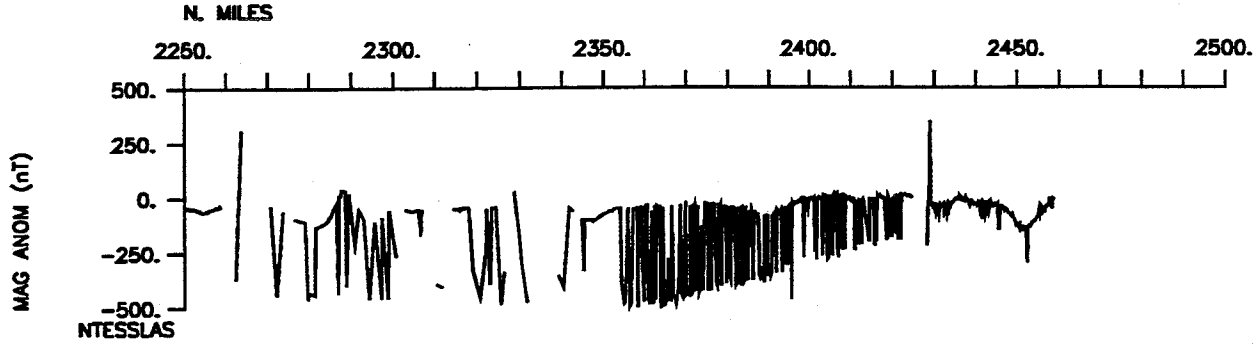

N. MILES
1750.
1800.
1850.
1900.
1950.
2000.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS
N. MILES
1750.
1800.
1850.
1900.
1950.
2000.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS
N. MILES
1750.
1800.
1850.
1900.
1950.
2000.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
1200/97AUG18
16
20
0000/97AUG19
04

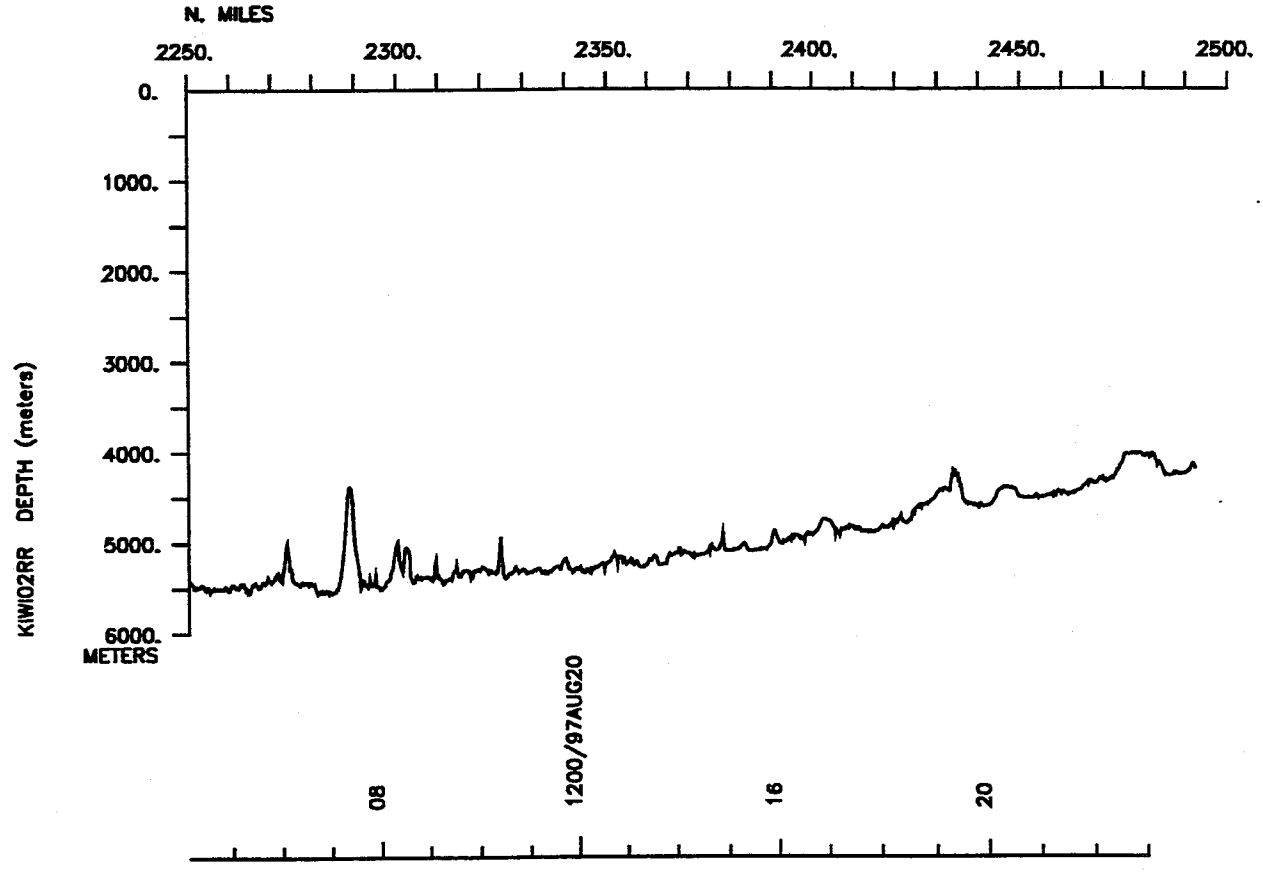

N. MILES
2000.
2050.
2100.
2150.
2200.
2250.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS

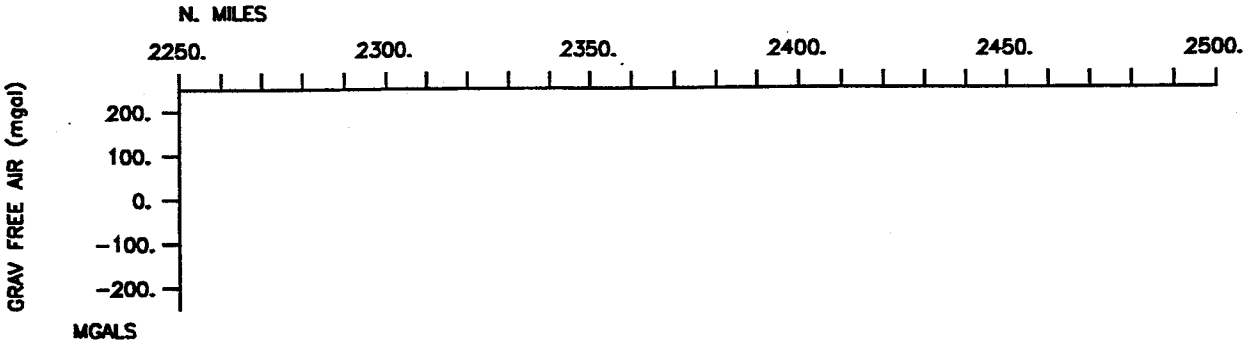

N. MILES
2000.
2050.
2100.
2150.
2200.
2250.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS

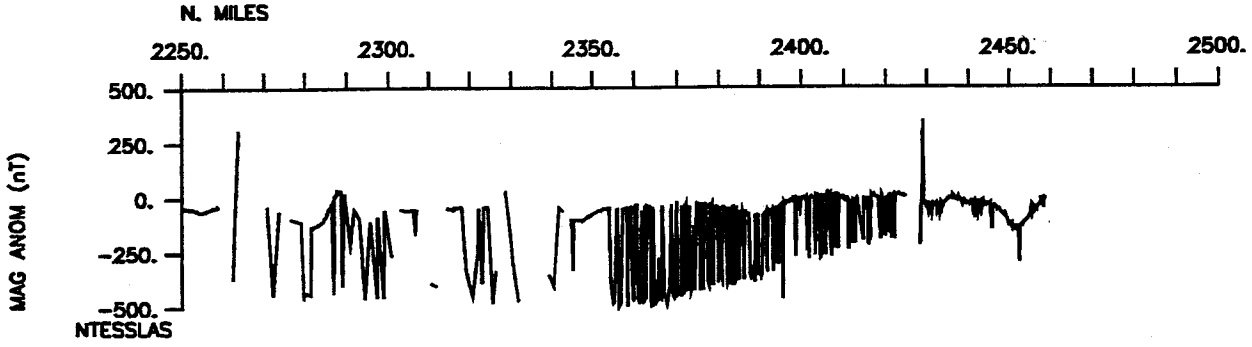

N. MILES
2000.
2050.
2100.
2150.
2200.
2250.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
08
1200/97AUG19
16
20
0000/97AUG20
04

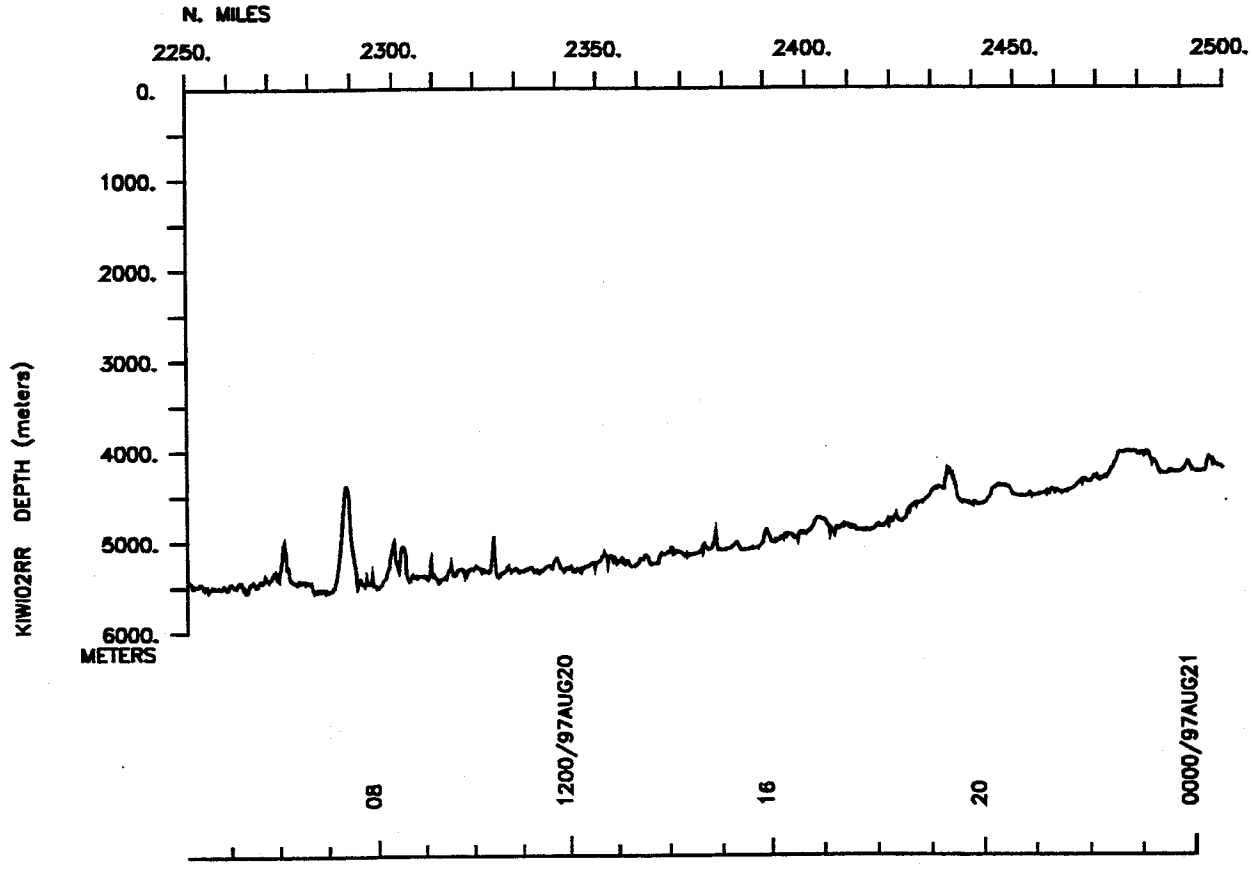

N. MILES
2250.
2300.
2350.
2400.
2450.
2500.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS

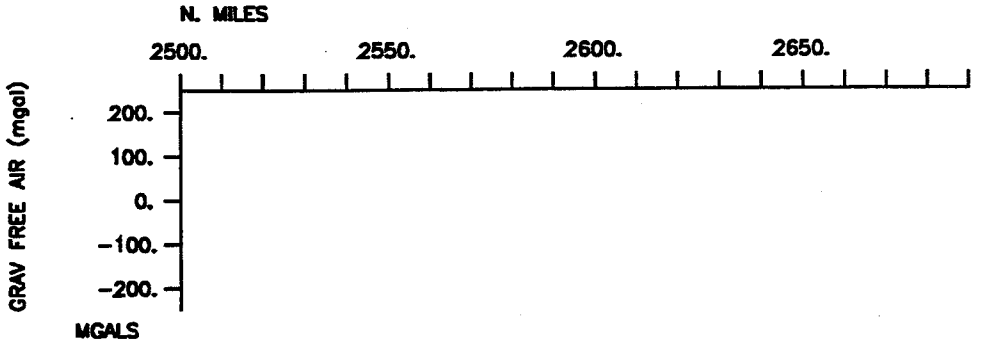

N. MILES
2250.
2300.
2350.
2400.
2450.
2500.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS

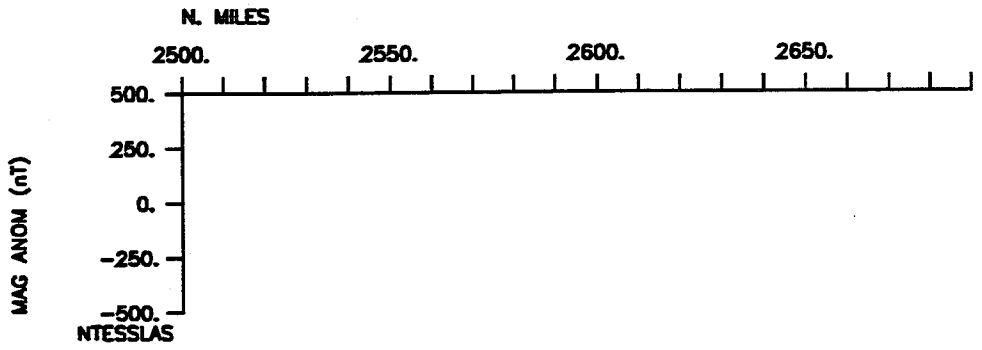

N. MILES
2250.
2300.
2350.
2400.
2450.
2500.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
08
1200/97AUG20
16
20

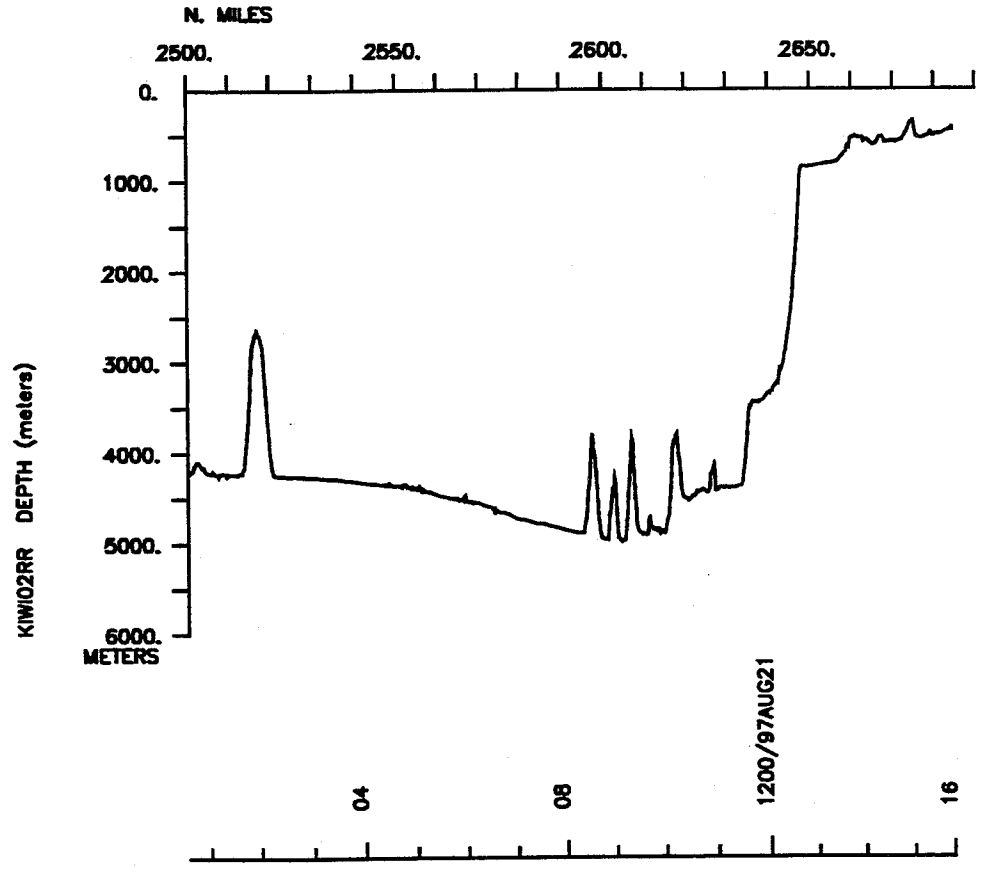

N. MILES
2250.
2300.
2350.
2400.
2450.
2500.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS


N. MILES
2250.
2300.
2350.
2400.
2450.
2500.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS


N. MILES
2250.
2300.
2350.
2400.
2450.
2500.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
08
1200/97AUG20
16
20
0000/97AUG21

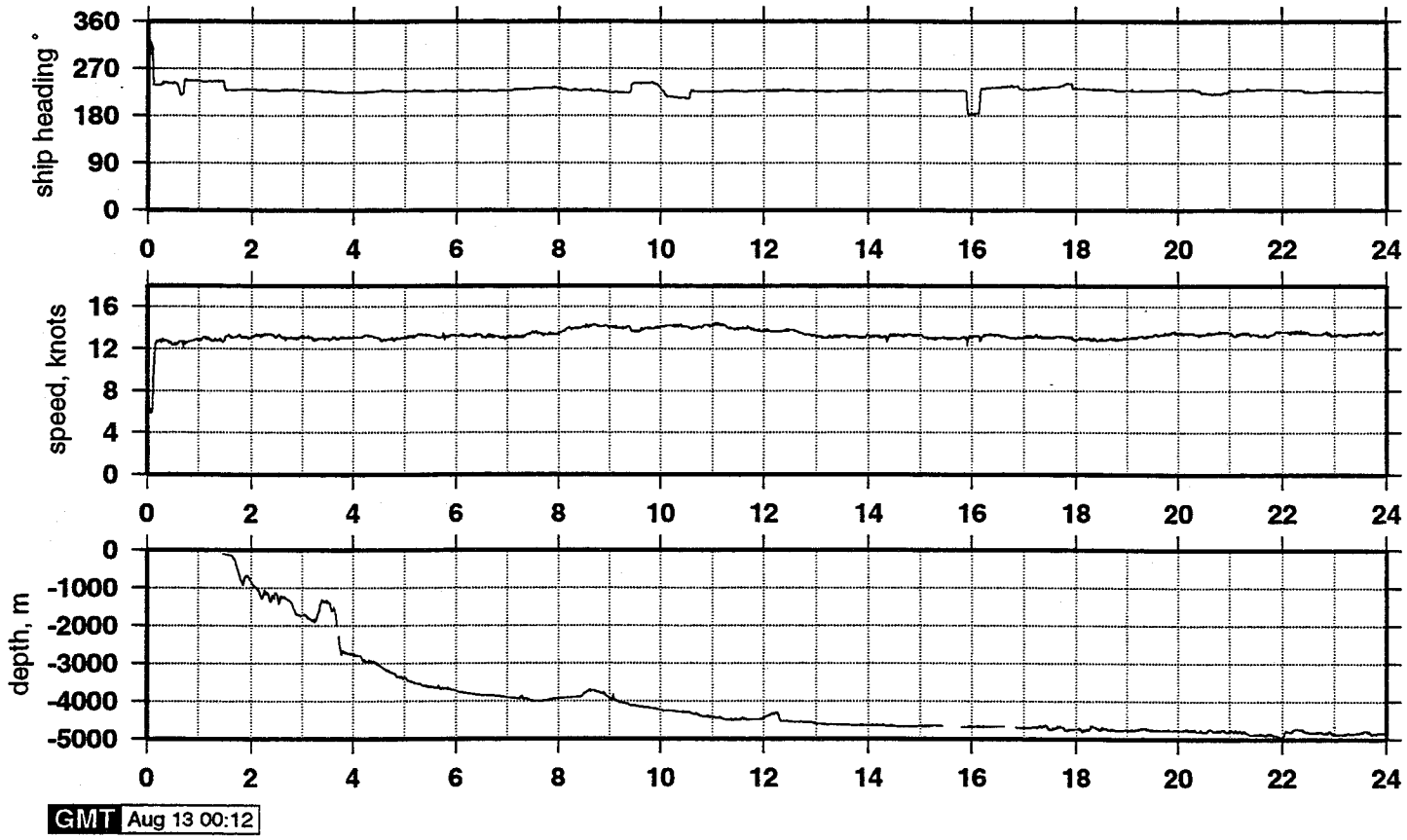

N. MILES
2500.
2550.
2600.
2650.
GRAV FREE AIR (mgal)
200.
100.
0.
-100.
-200.
MGALS


N. MILES
2500.
2550.
2600.
2650.
MAG ANOM (nT)
500.
250.
0.
-250.
-500.
NTESSLAS


N. MILES
2500.
2550.
2600.
2650.
KIWI02RR DEPTH (meters)
0.
1000.
2000.
3000.
4000.
5000.
6000.
METERS
04
08
1200/97AUG21
16

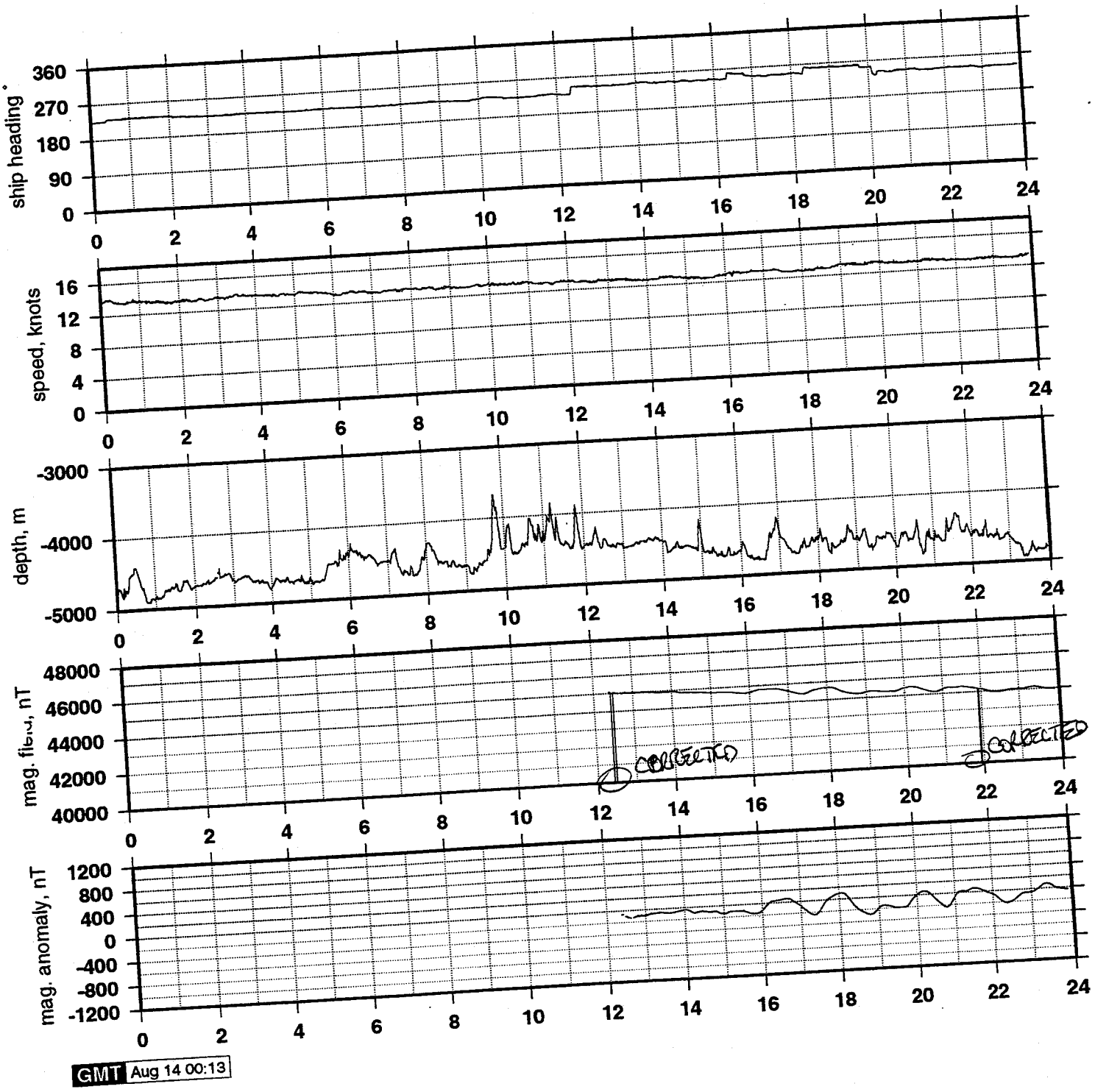
U/W data KIWI02RR 97aug12

63



U/W data KIWI02RR 97aug13

64



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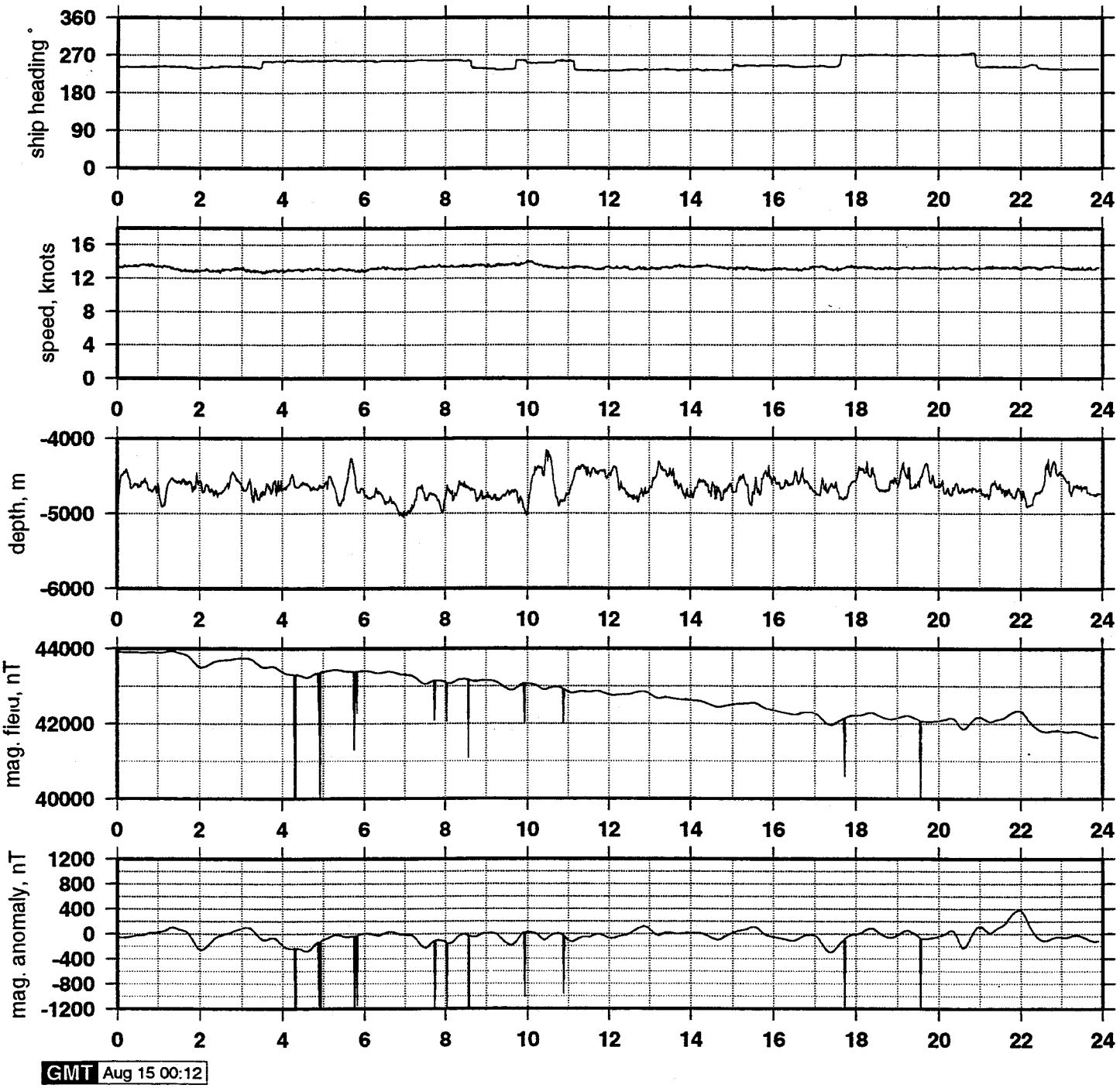
65



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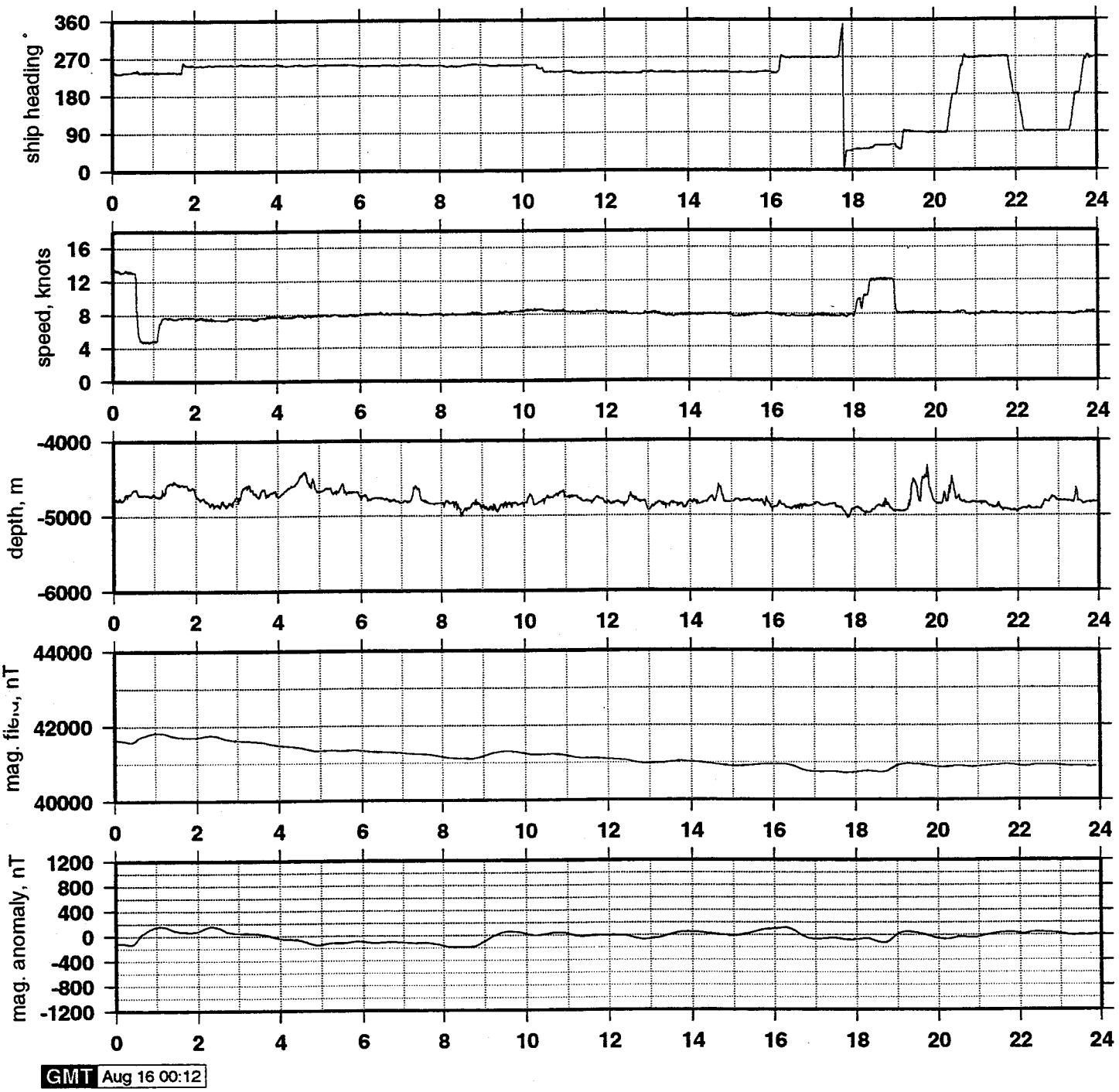

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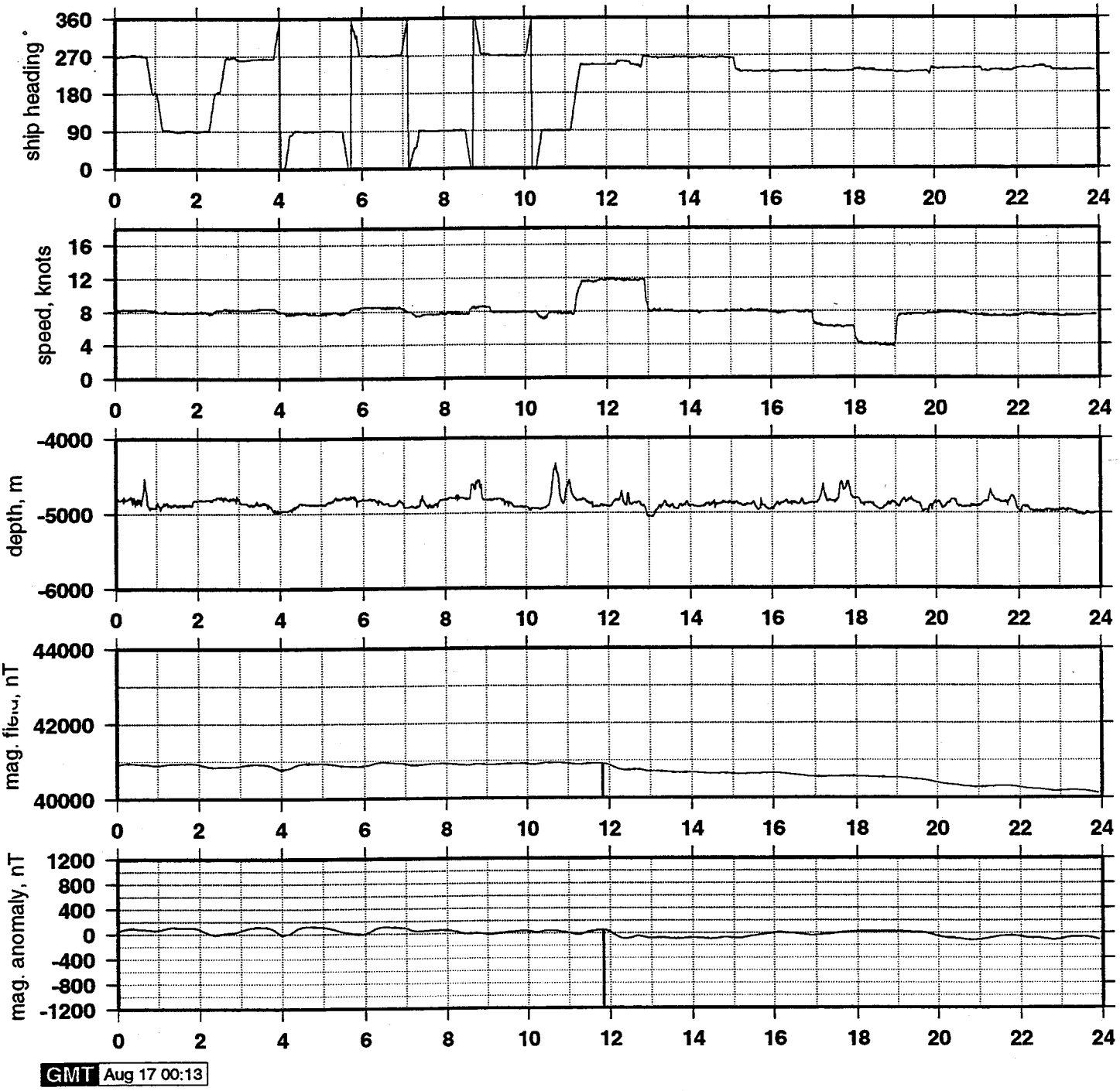

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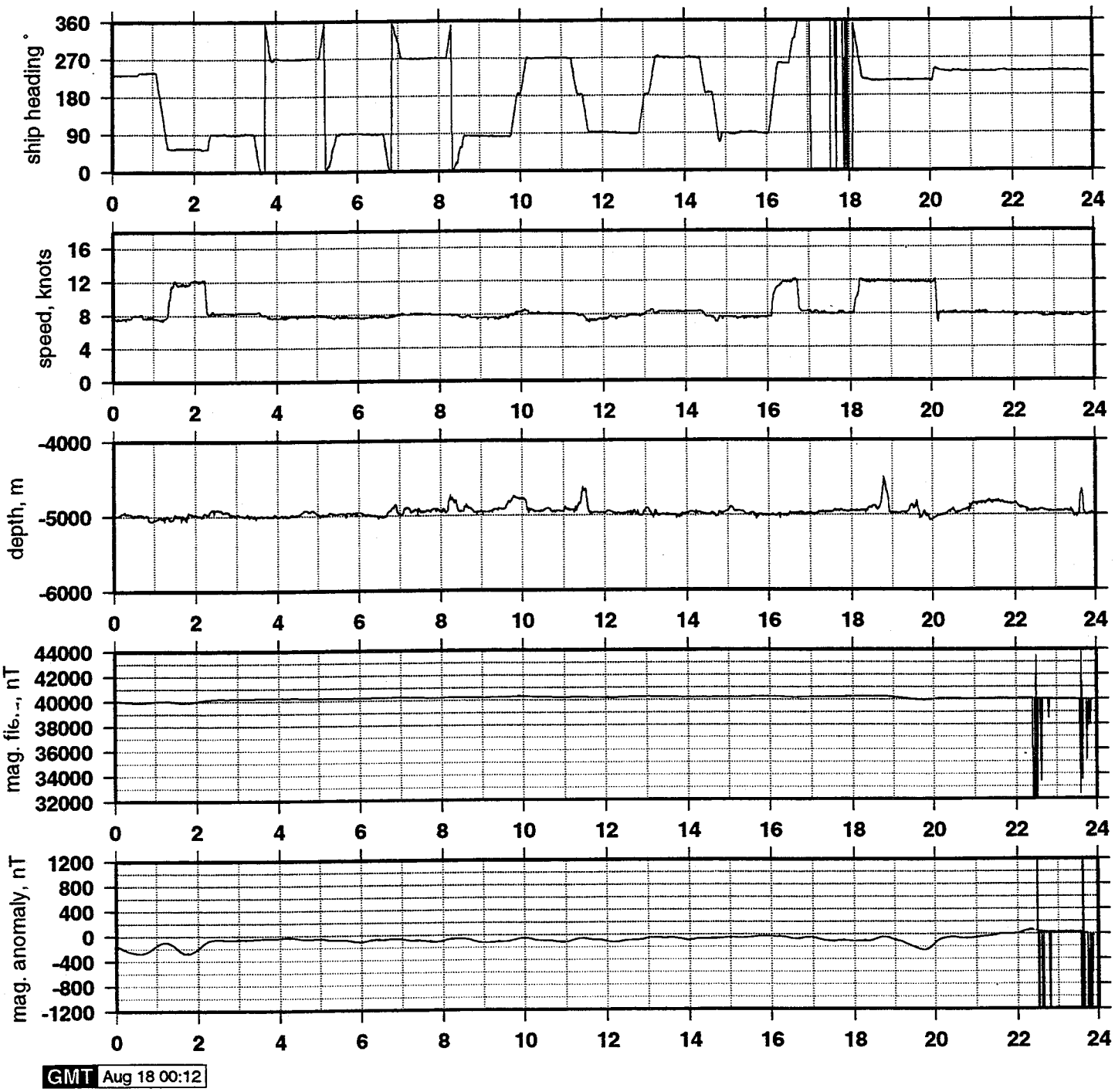

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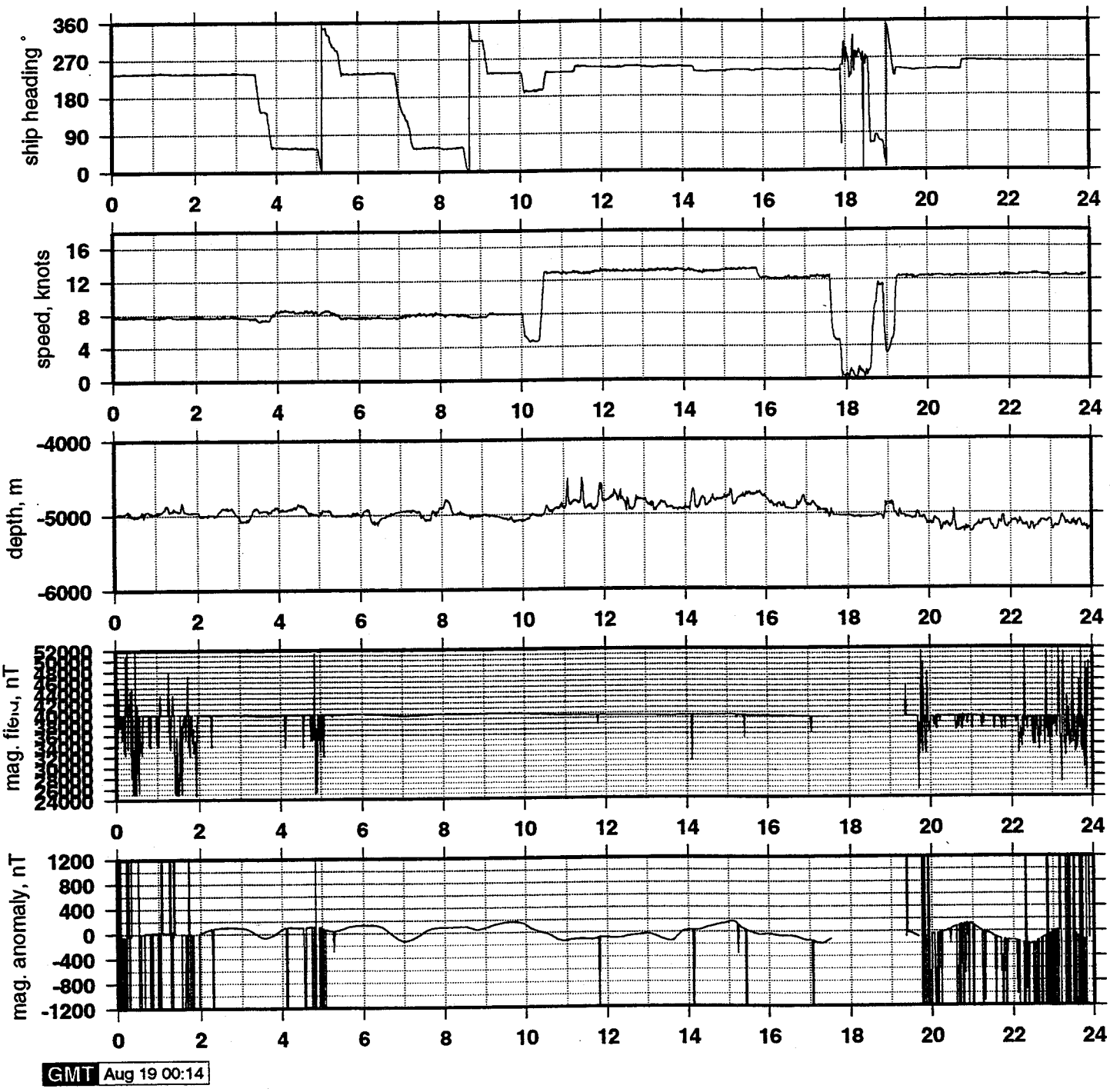

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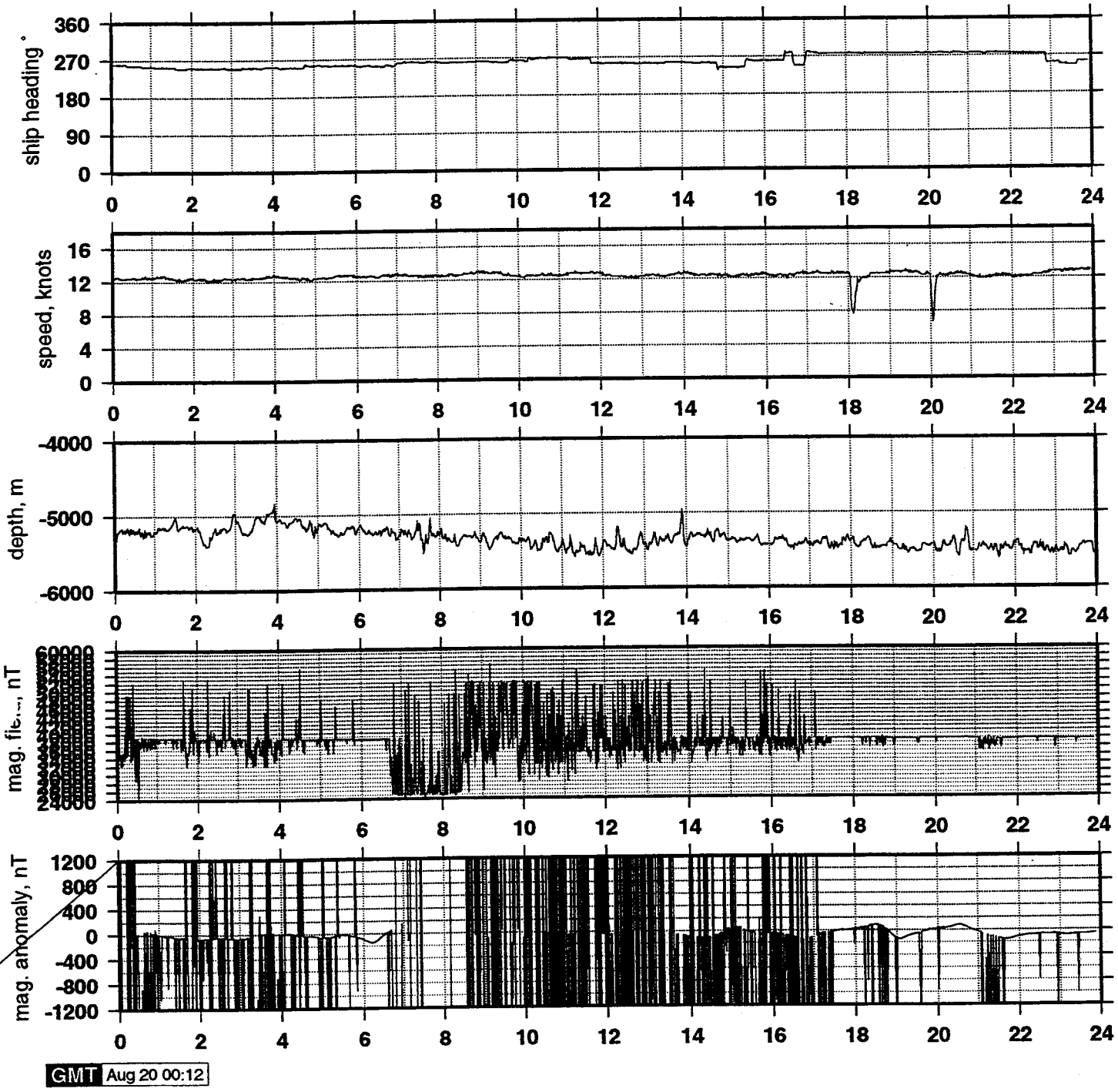

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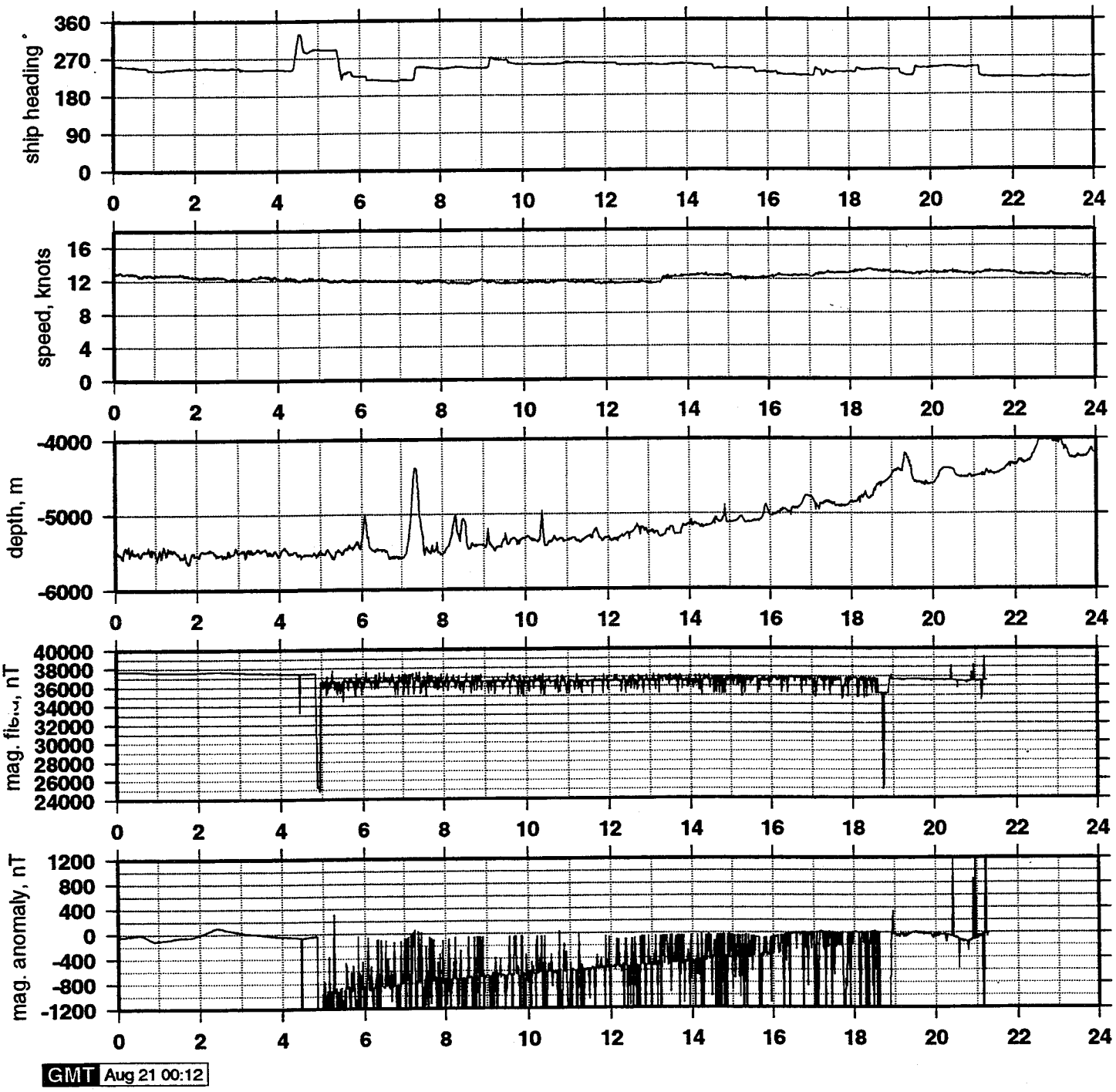

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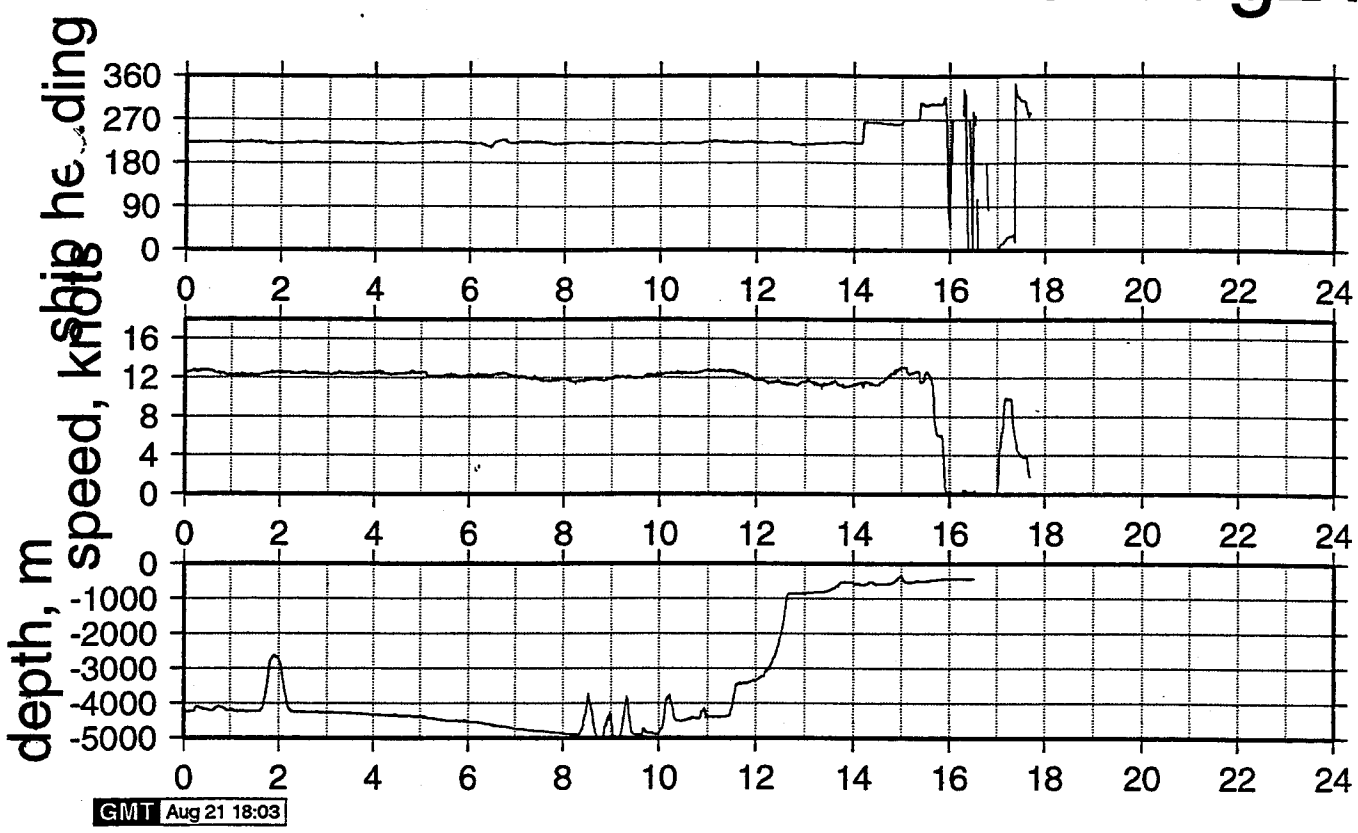


73

APPENDIX D: H2O CABLE SURVEY - DATA INVENTORY

ARCHIVAL DATA FROM JIM CHARTERS

SEABEAM, 3.5, Mag, Nav, etc.

1. CD-ROM
2. 32 page listing of files on CD-Rom
3. DAT tape
4. PC floppy with listings of back-up tapes and tar files

Seismic Data

5. Raw Seismics - Tape 1 - 1 DAT tape
   1 Exabyte tape
6. Raw Seismic Data - 1 DAT } controversial, probably they
   1 Exabyte } do not contain any data

Working Files

7. Work.Disk.01 - Exabyte
8. Work.Disk.02 - Exabyte
9. Ralph's Mac floppy with reports

Paper

10. Sample index
11. 3 large pages of Calcomp for 3 sites
12. 3 large pages of SEABEAM plots
13. 3-ring binder - science notes
14. 3-ring binder - SEABEAM plots
15. SCS-EPC roll
16. SEABEAM EPC roll
17. 3.5 EPC roll
18. Executive Summary and Cruise Report

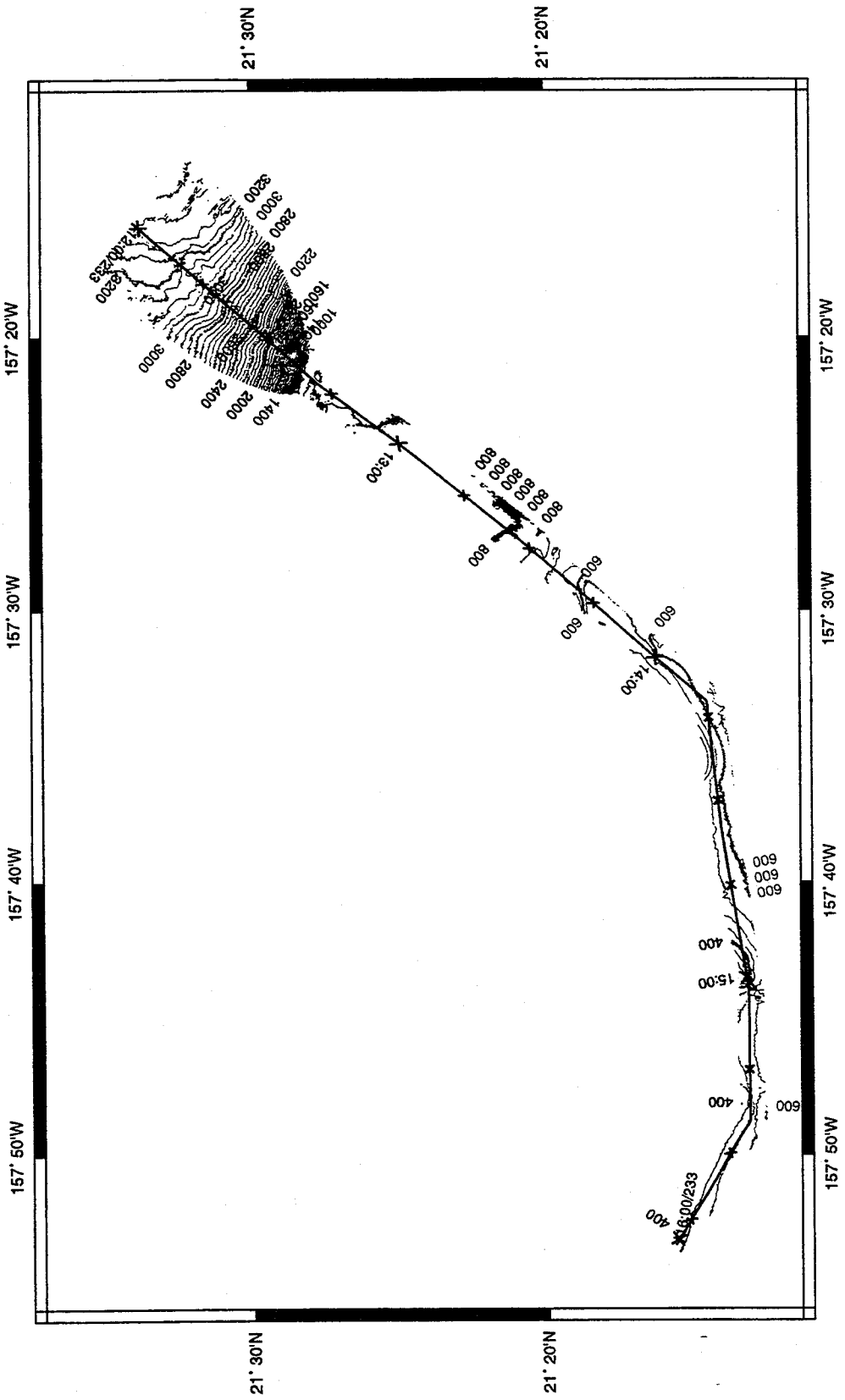
Items 7 through 13 were brought home by Ralph.

Item 14 was brought home by Bob.

Items 15 through 17 were sent to S10 for filming - contact Stu Smith.

Appendix E: Navigation and SEABEAM Bathymetry

74



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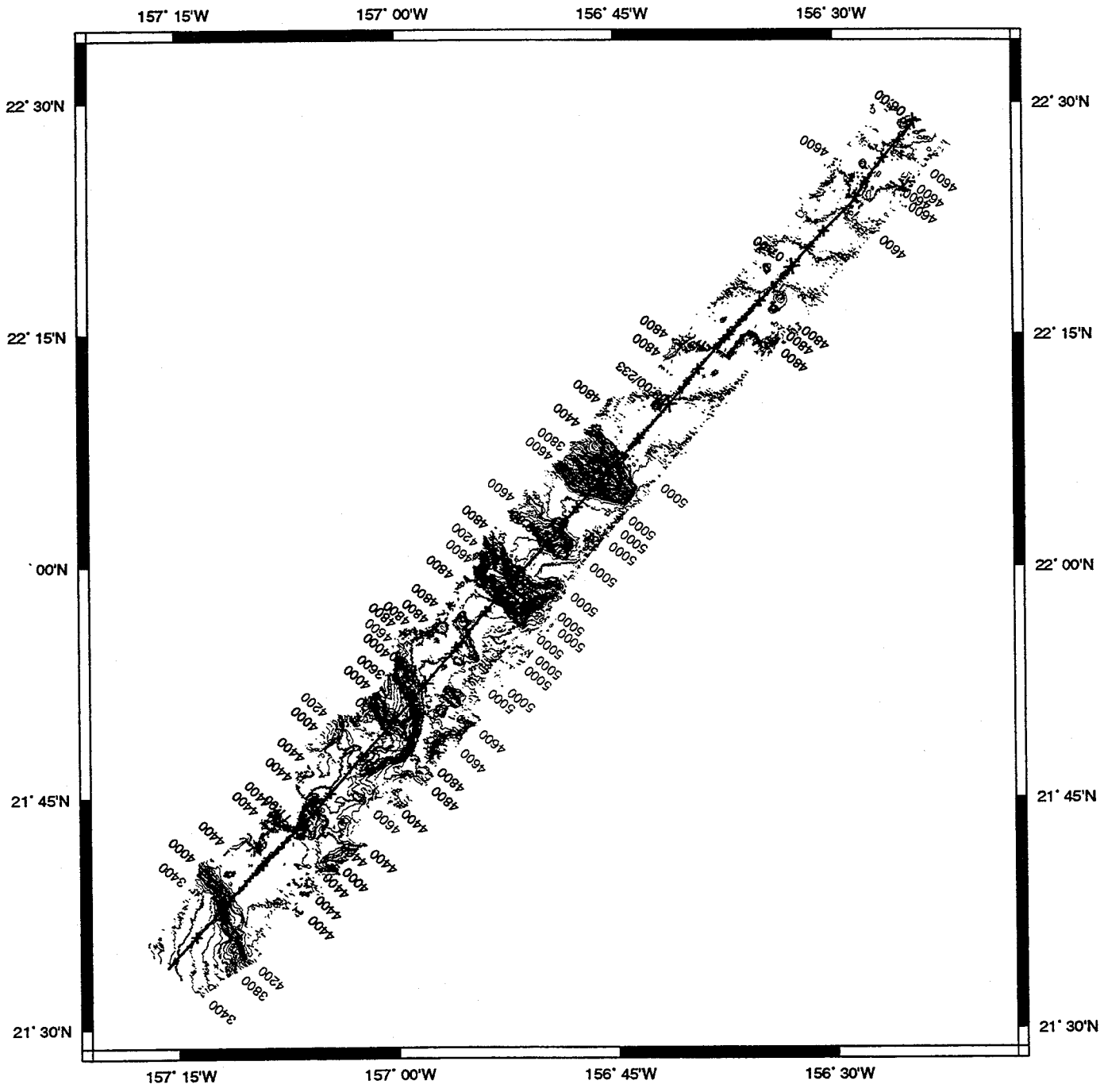

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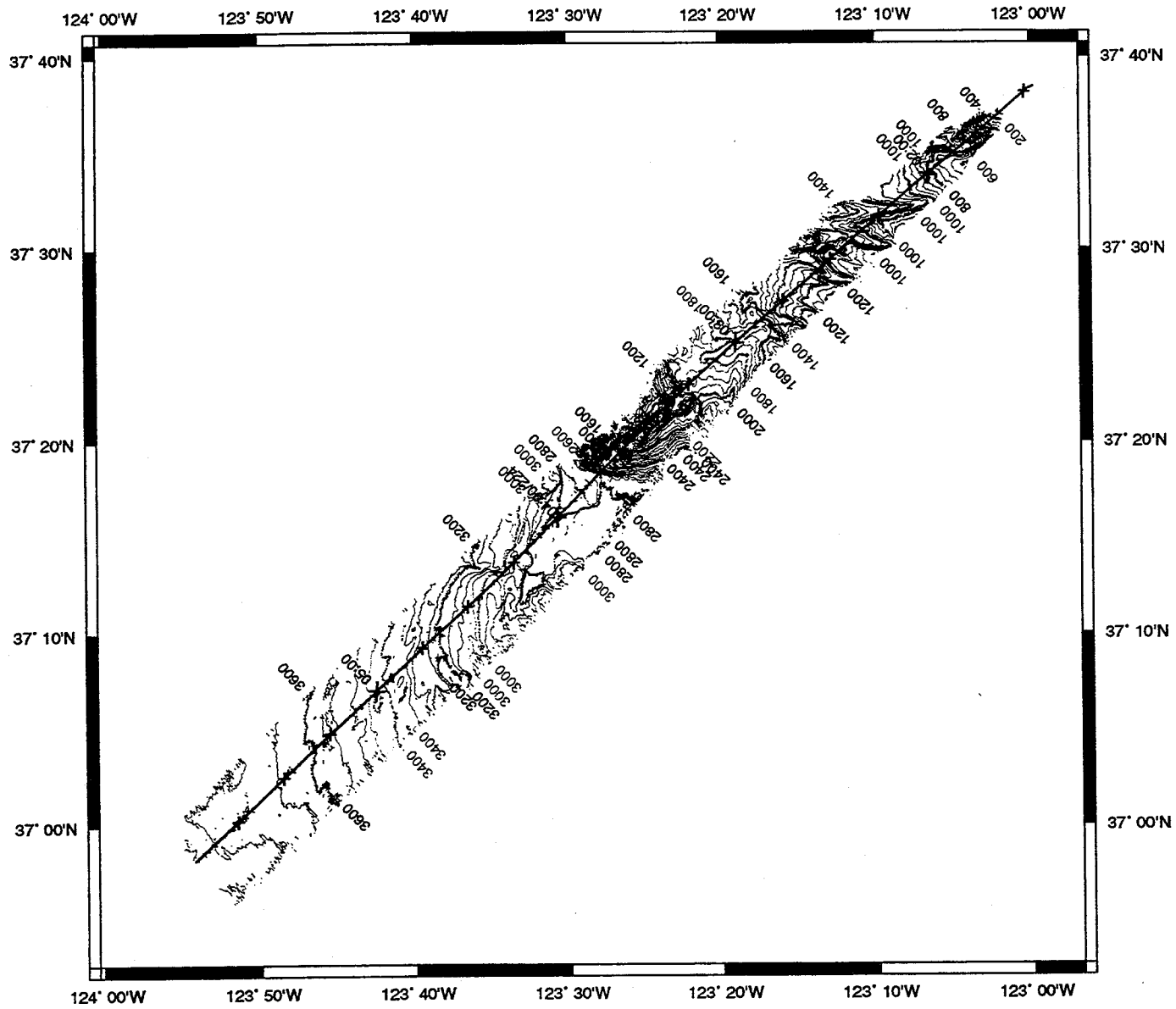

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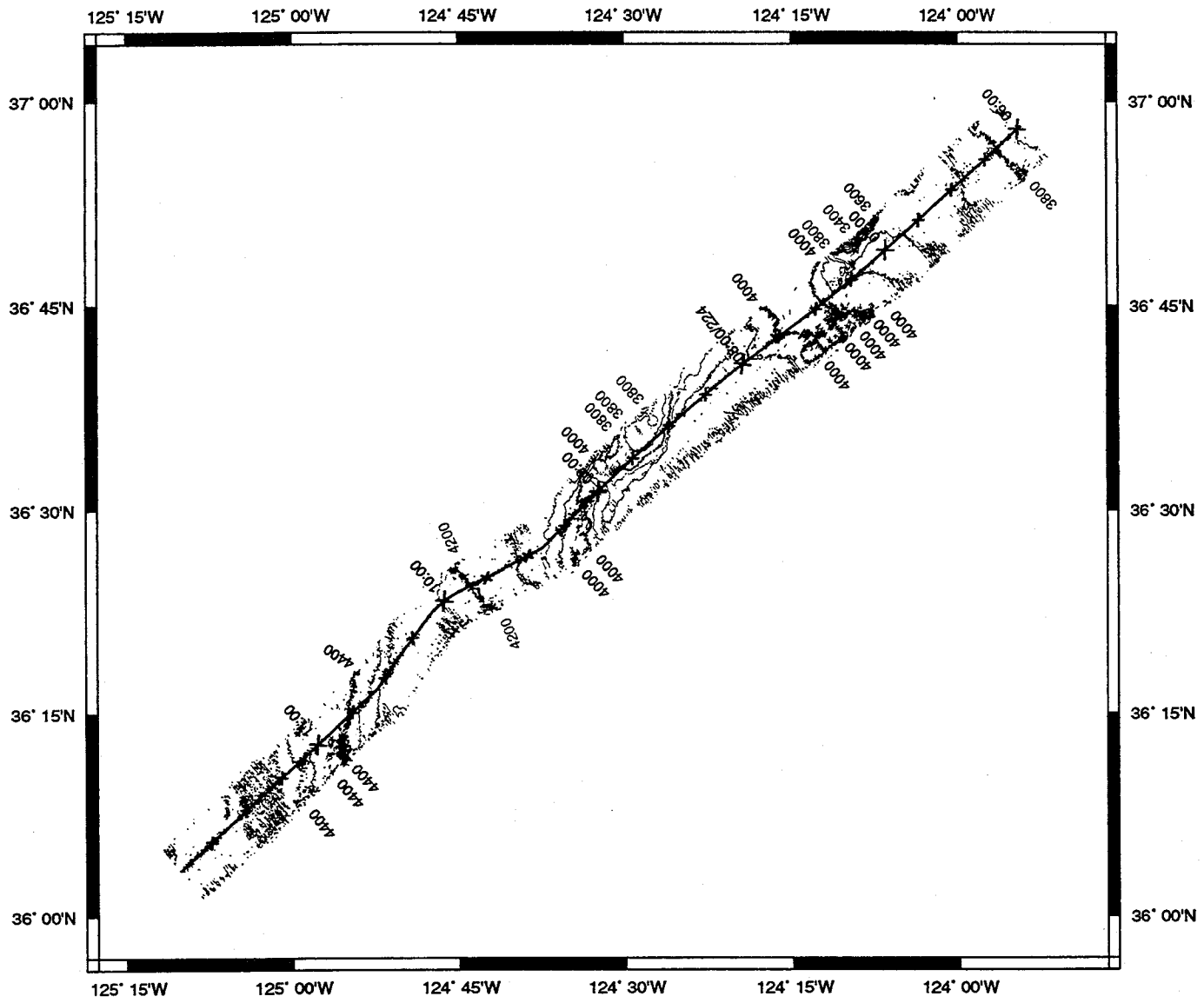

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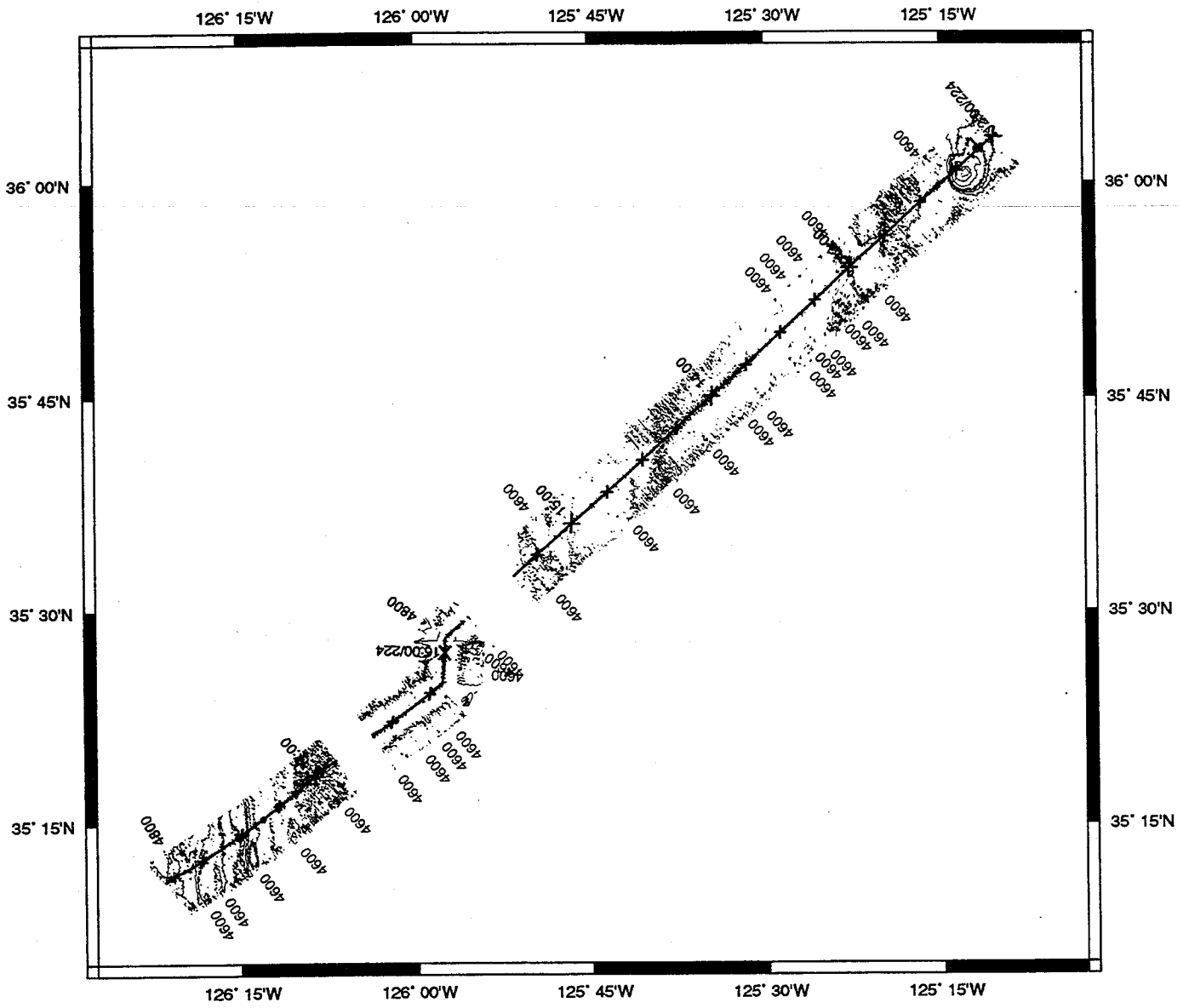

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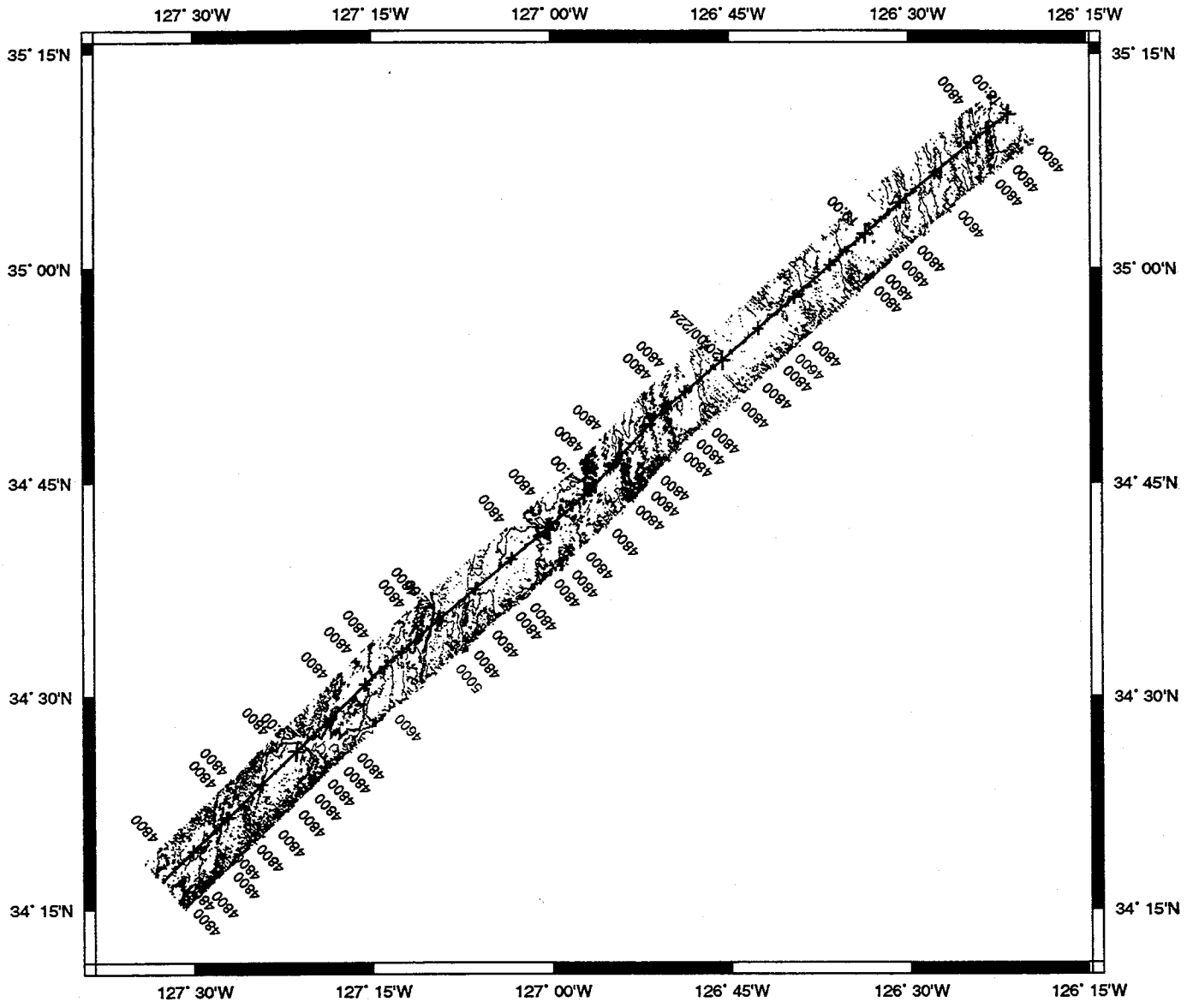

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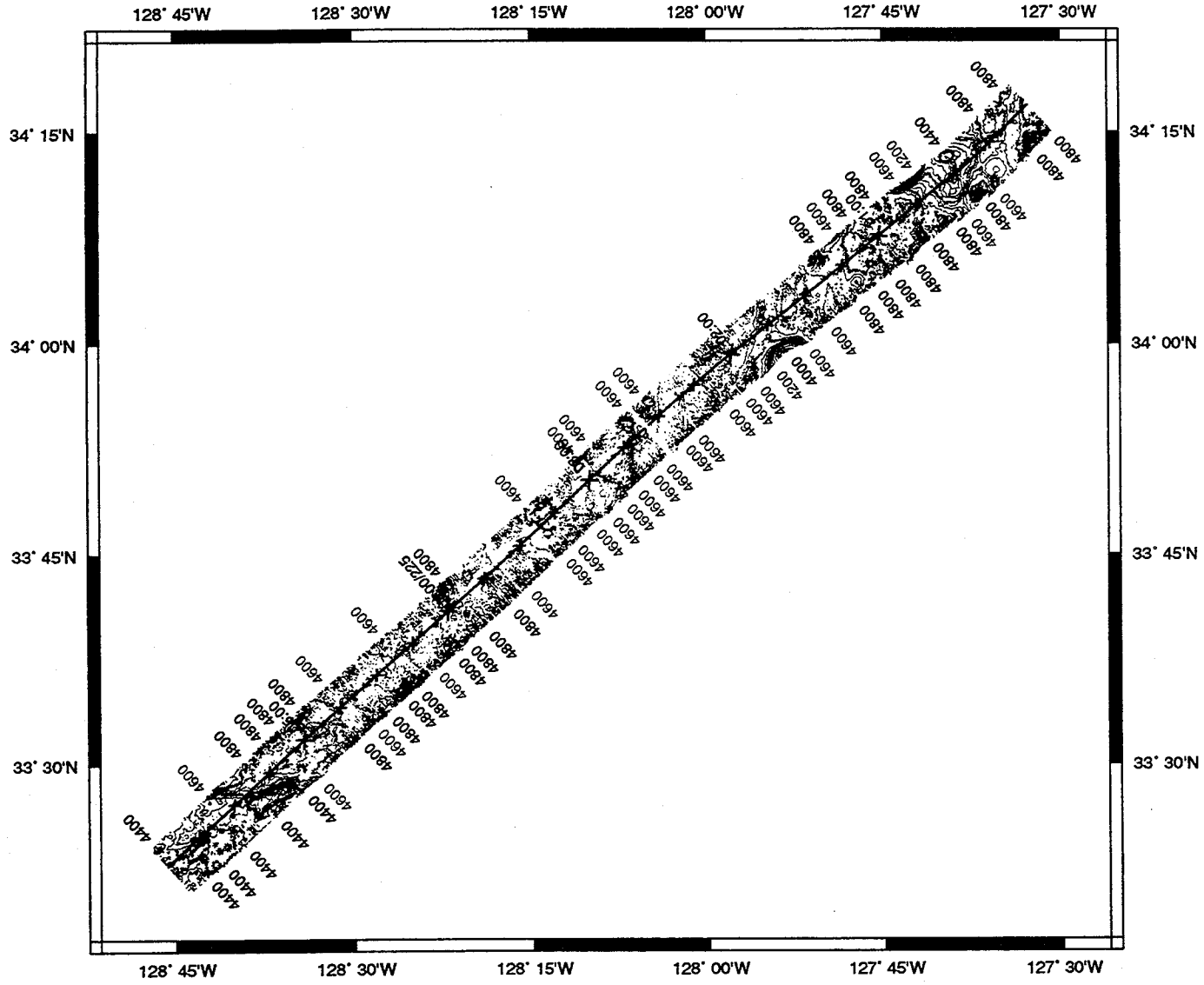

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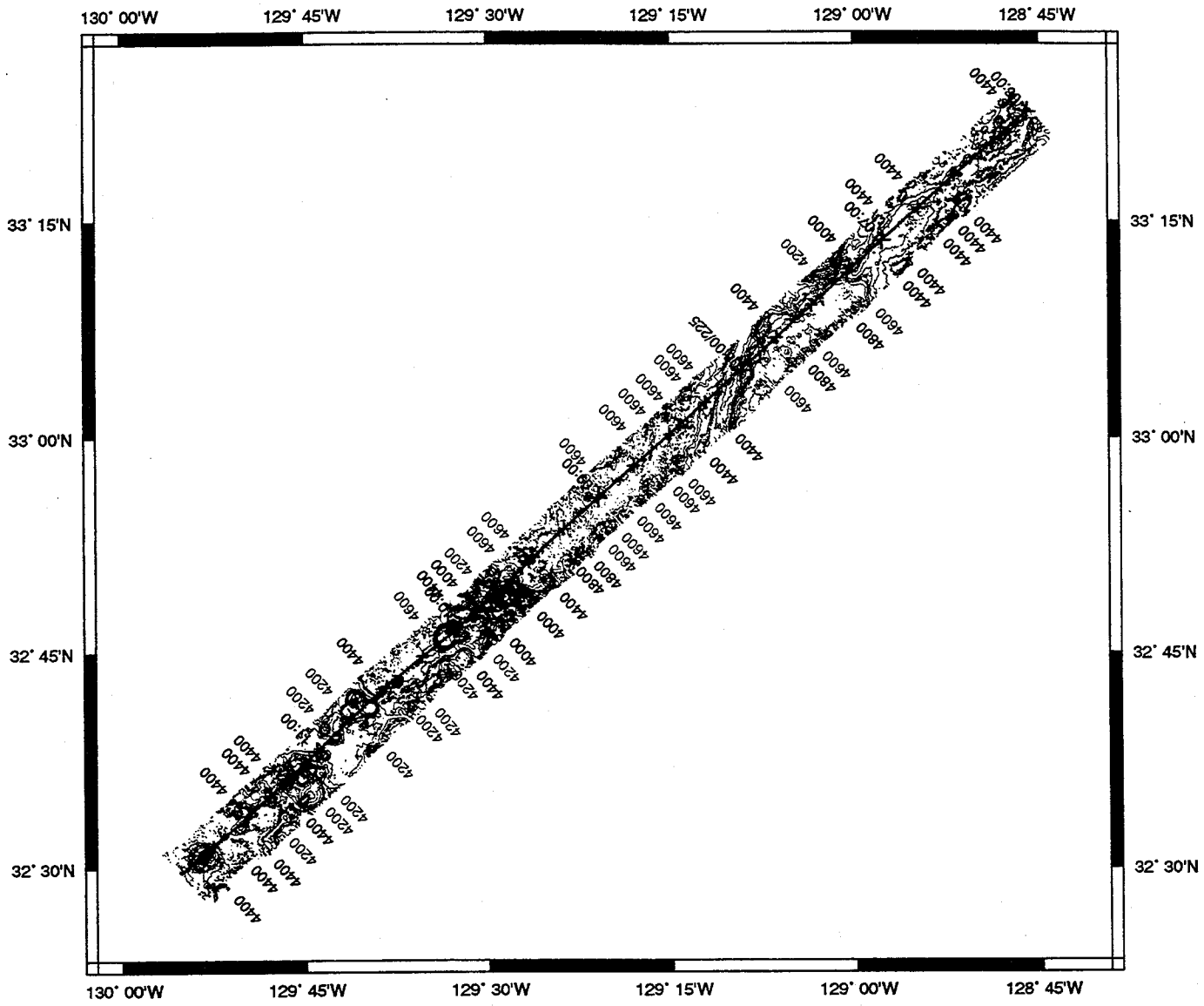

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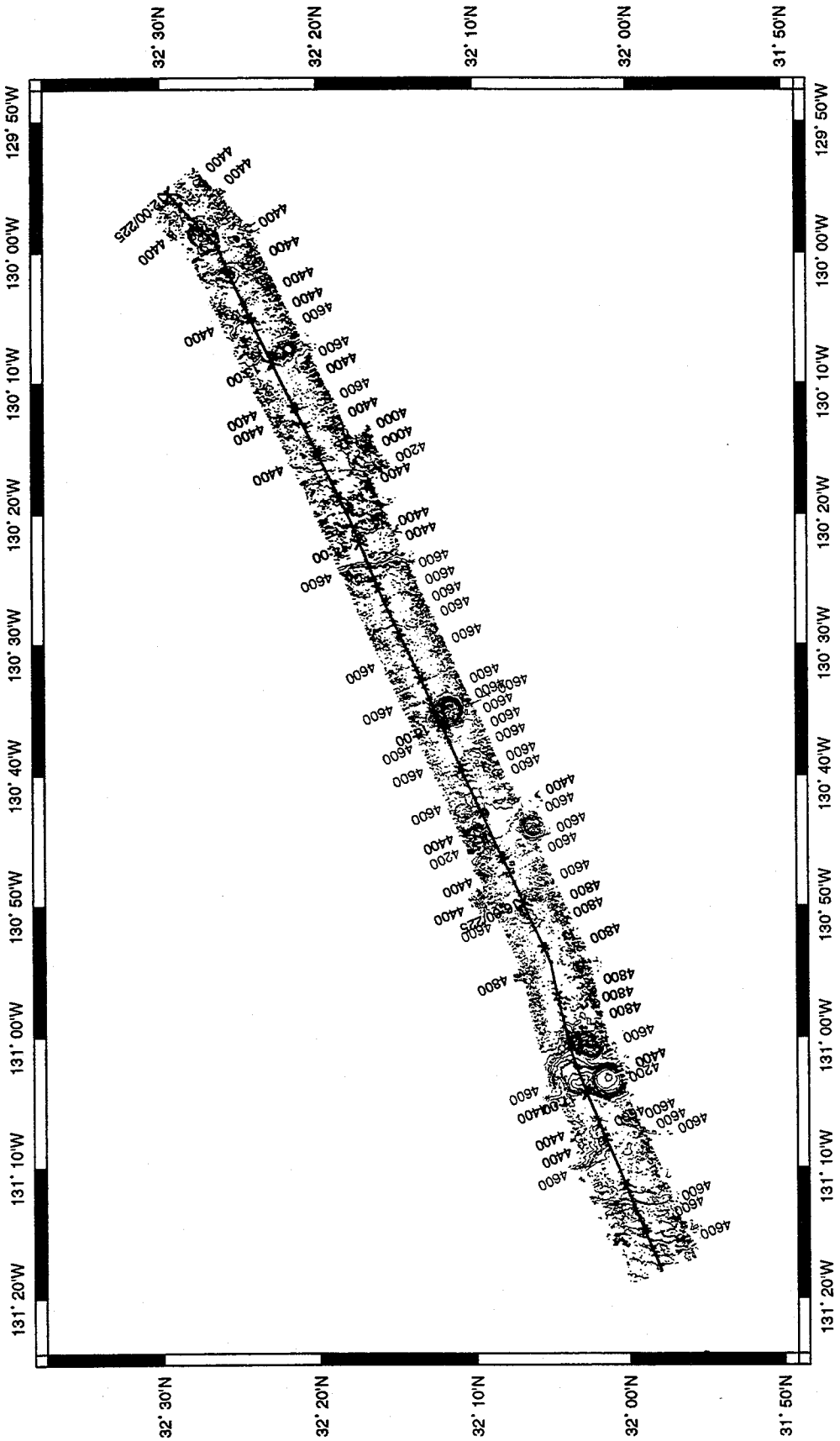
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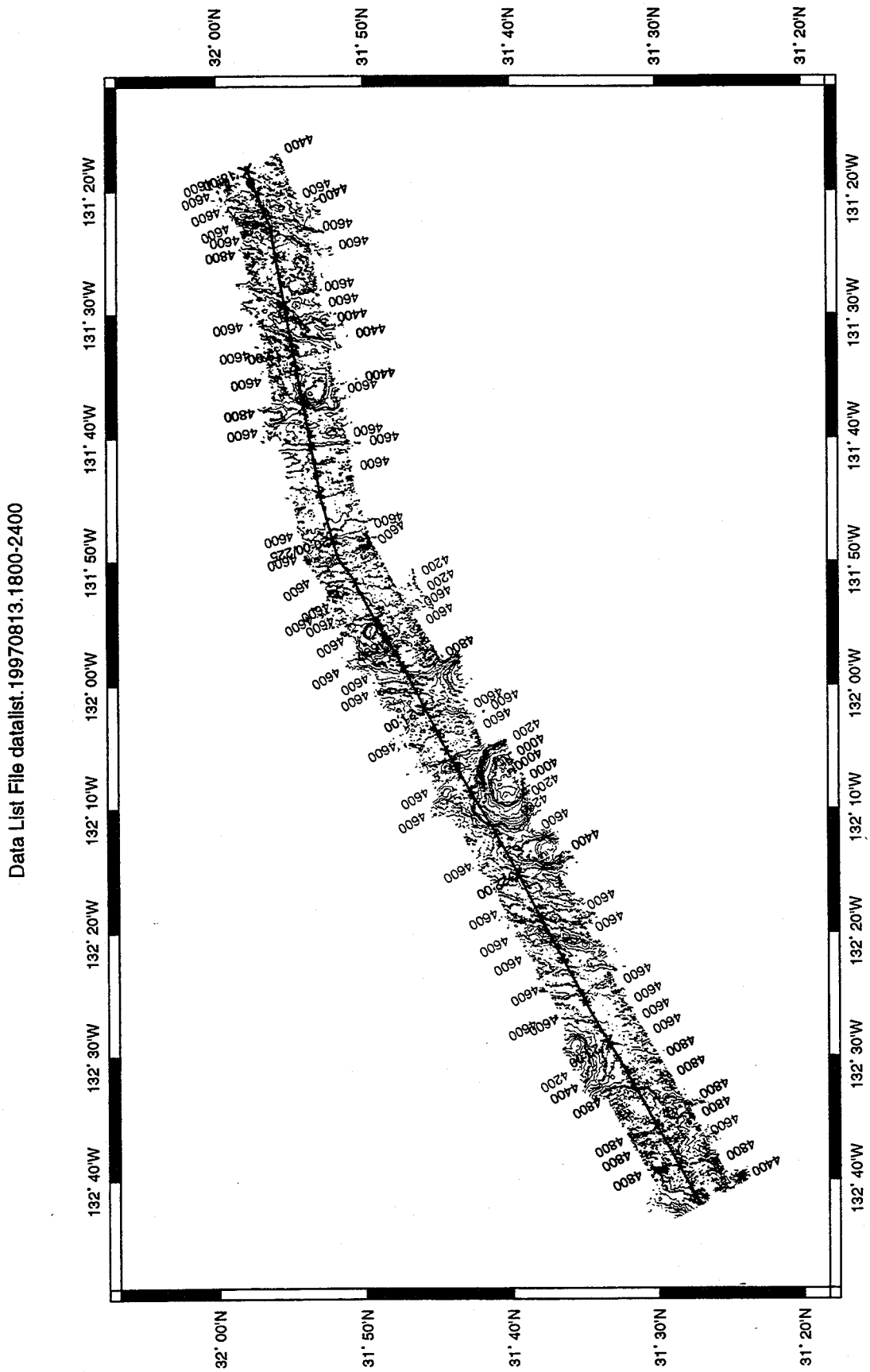
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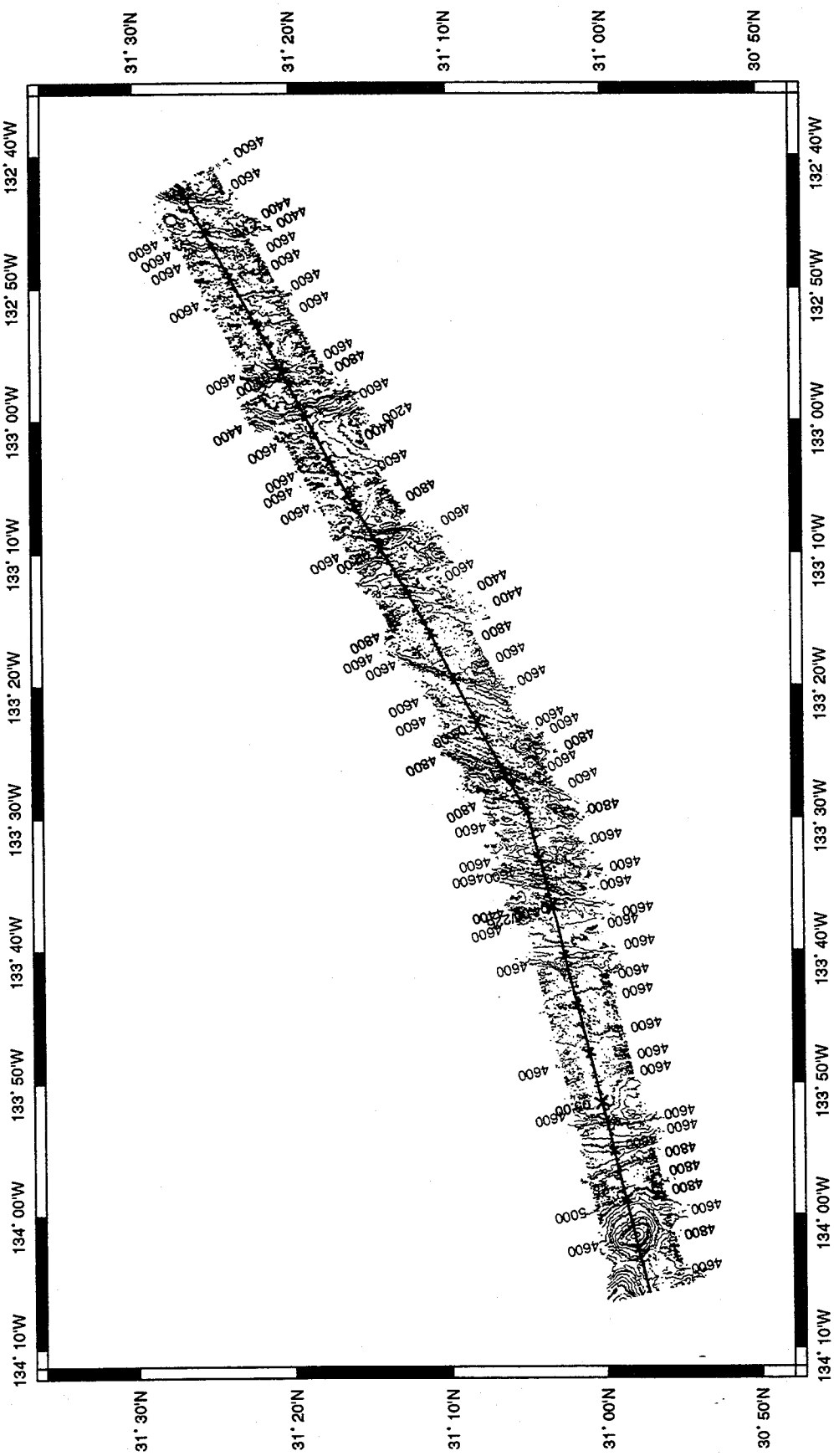

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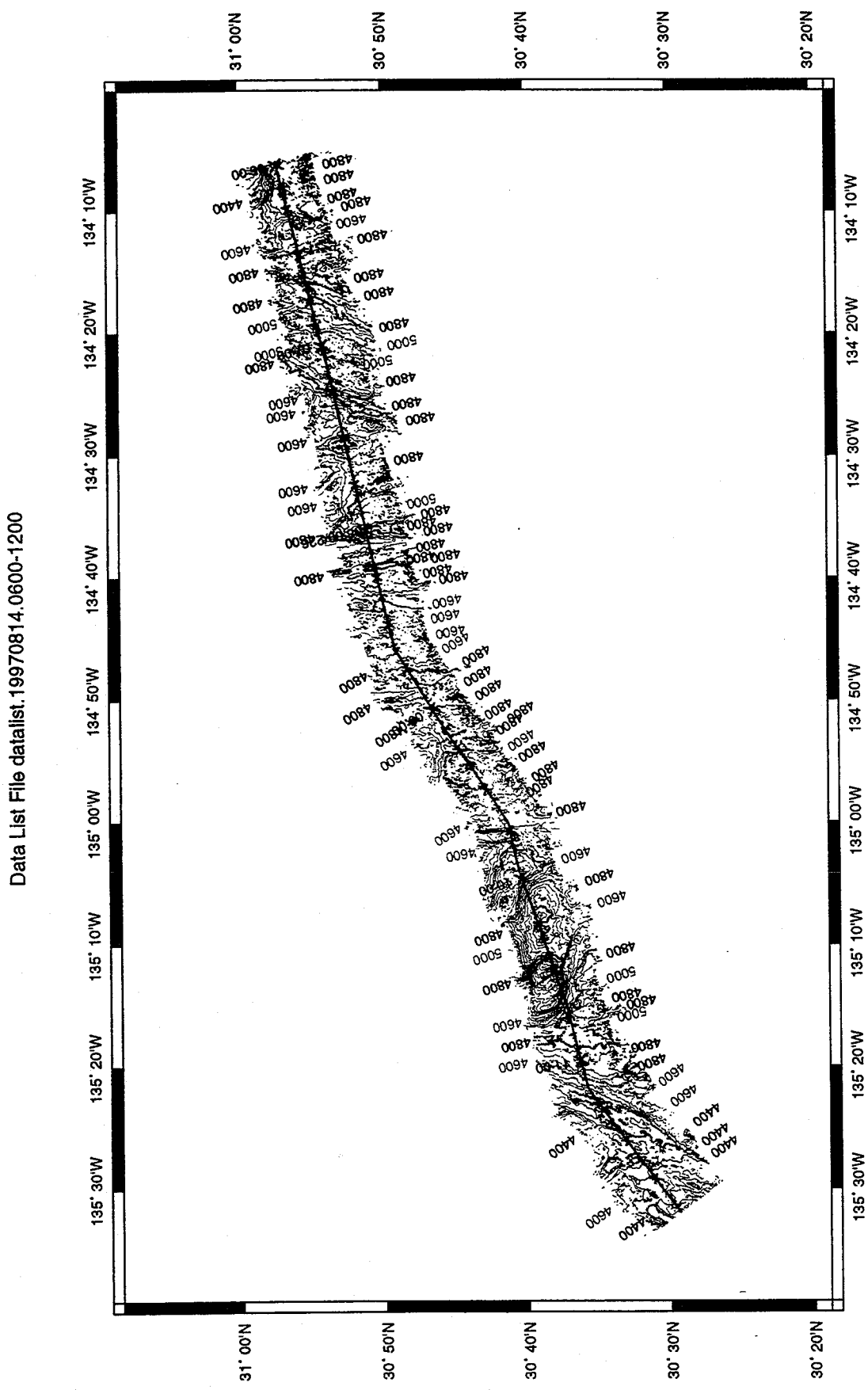
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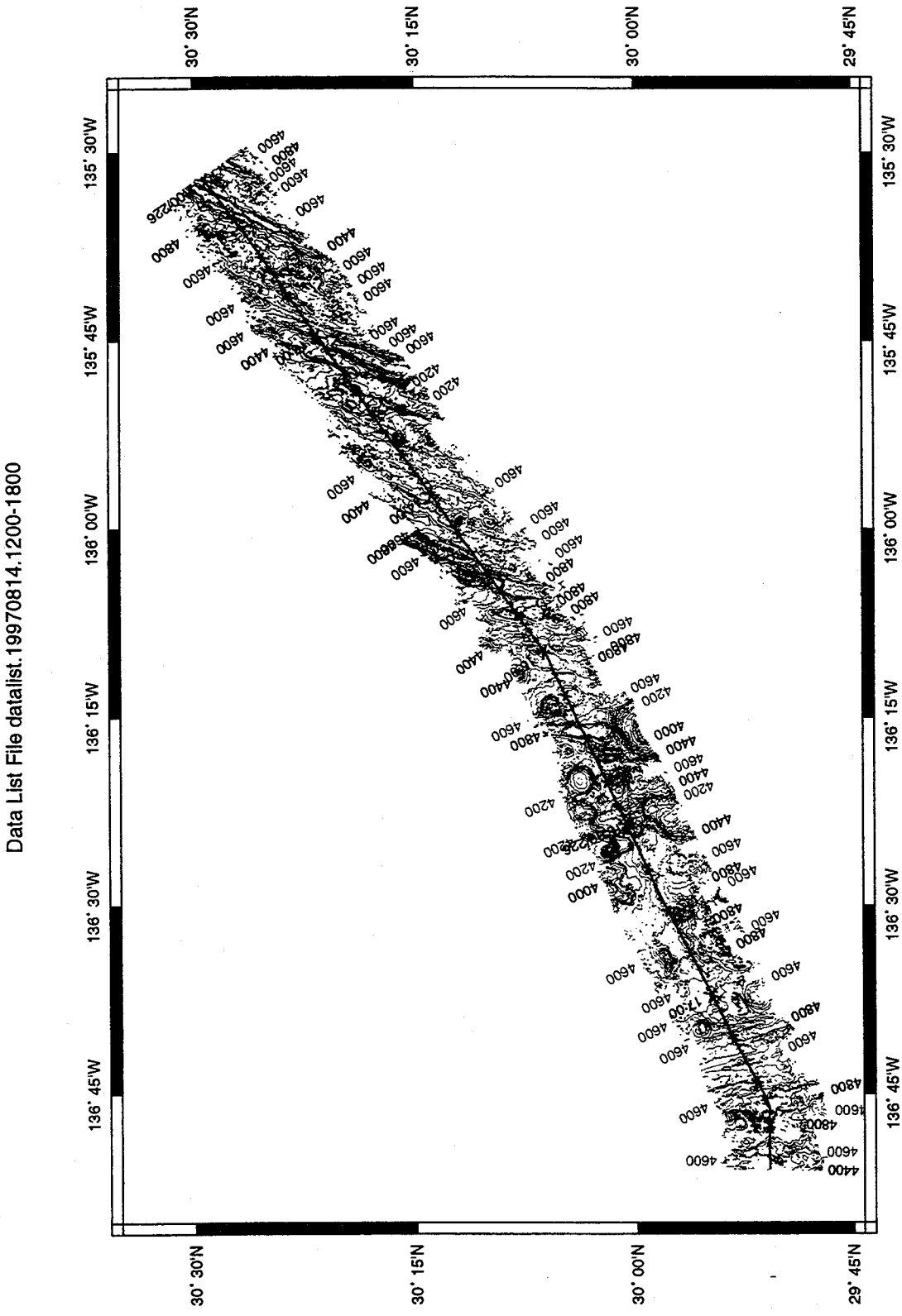

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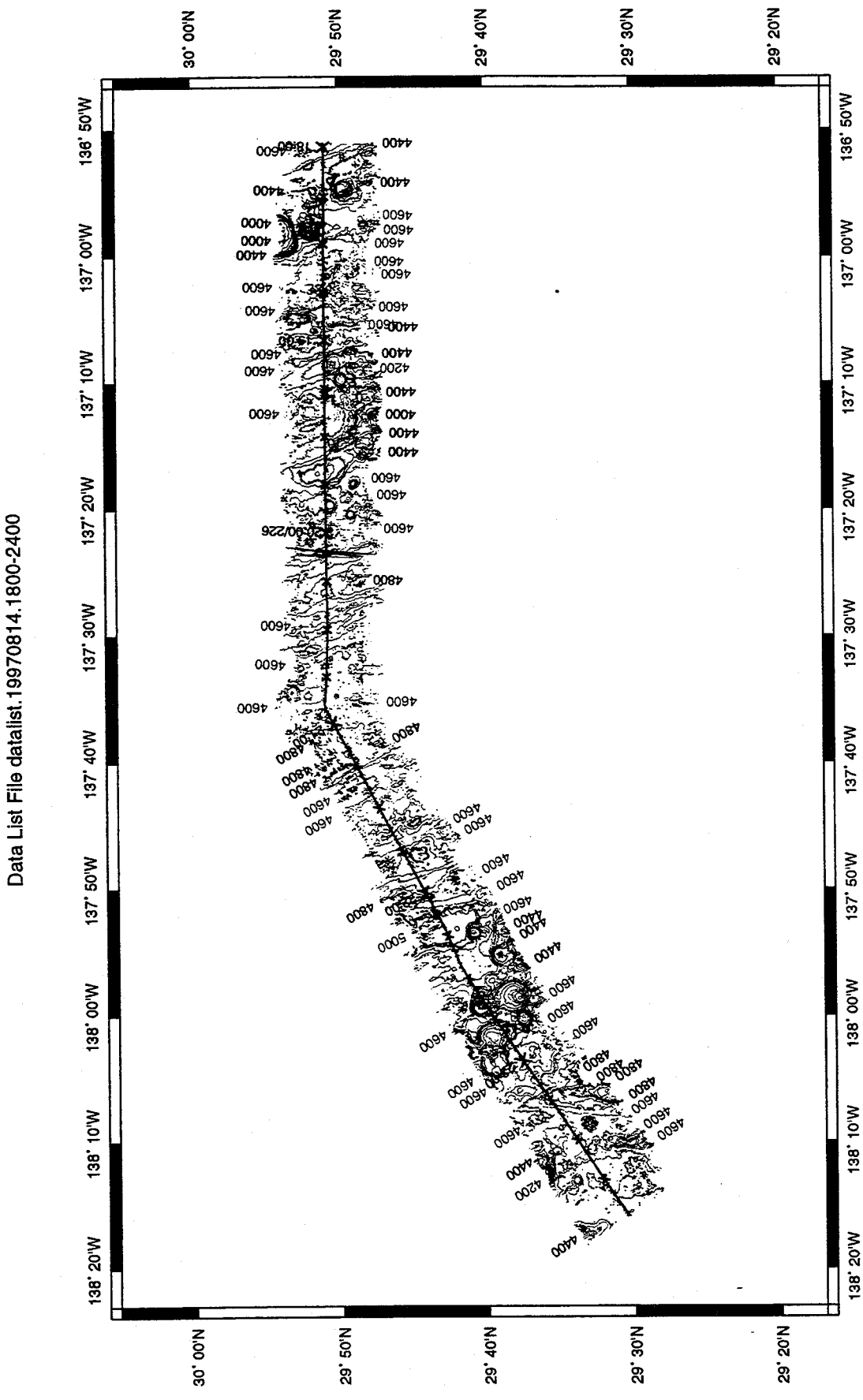
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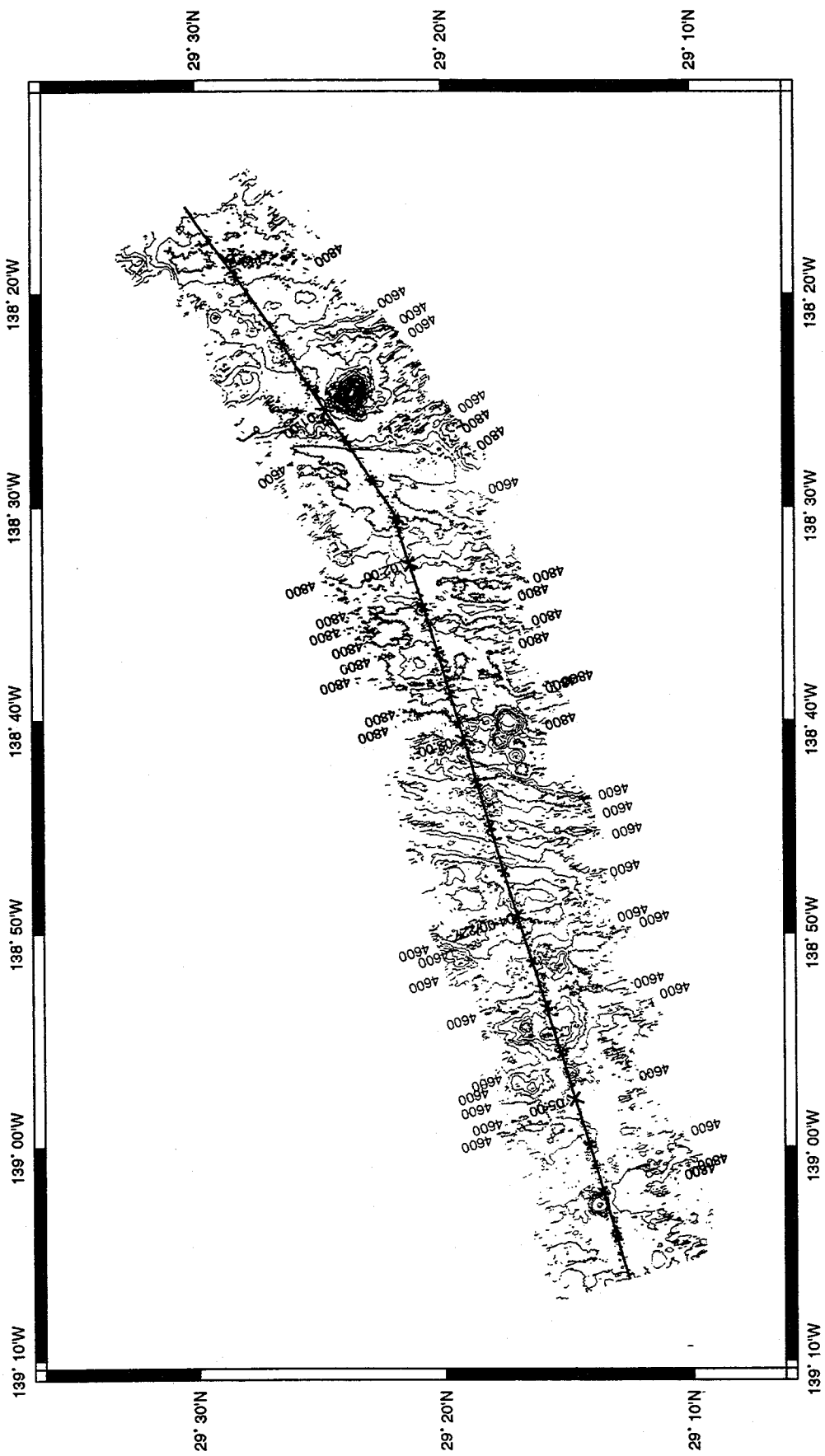
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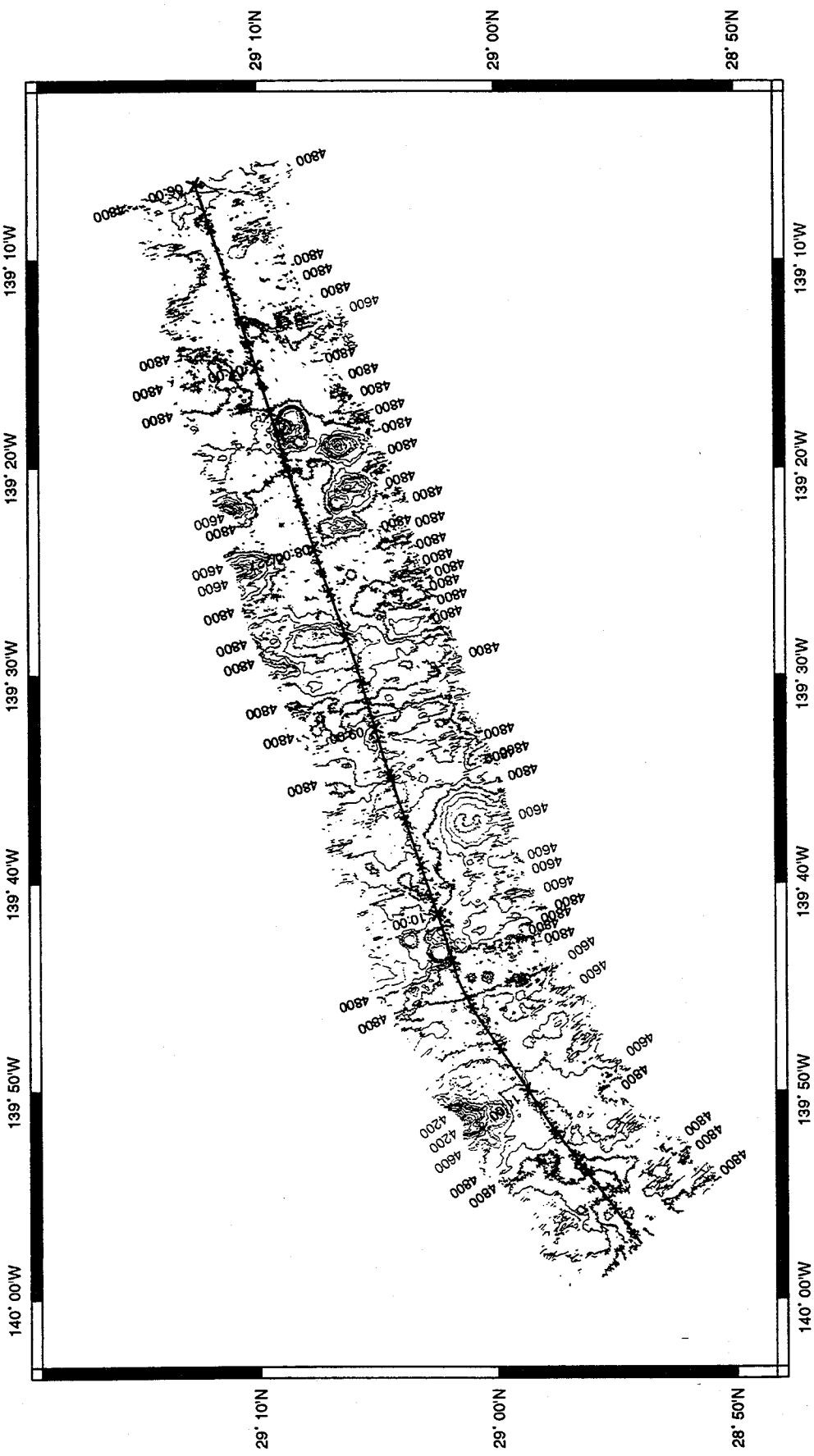

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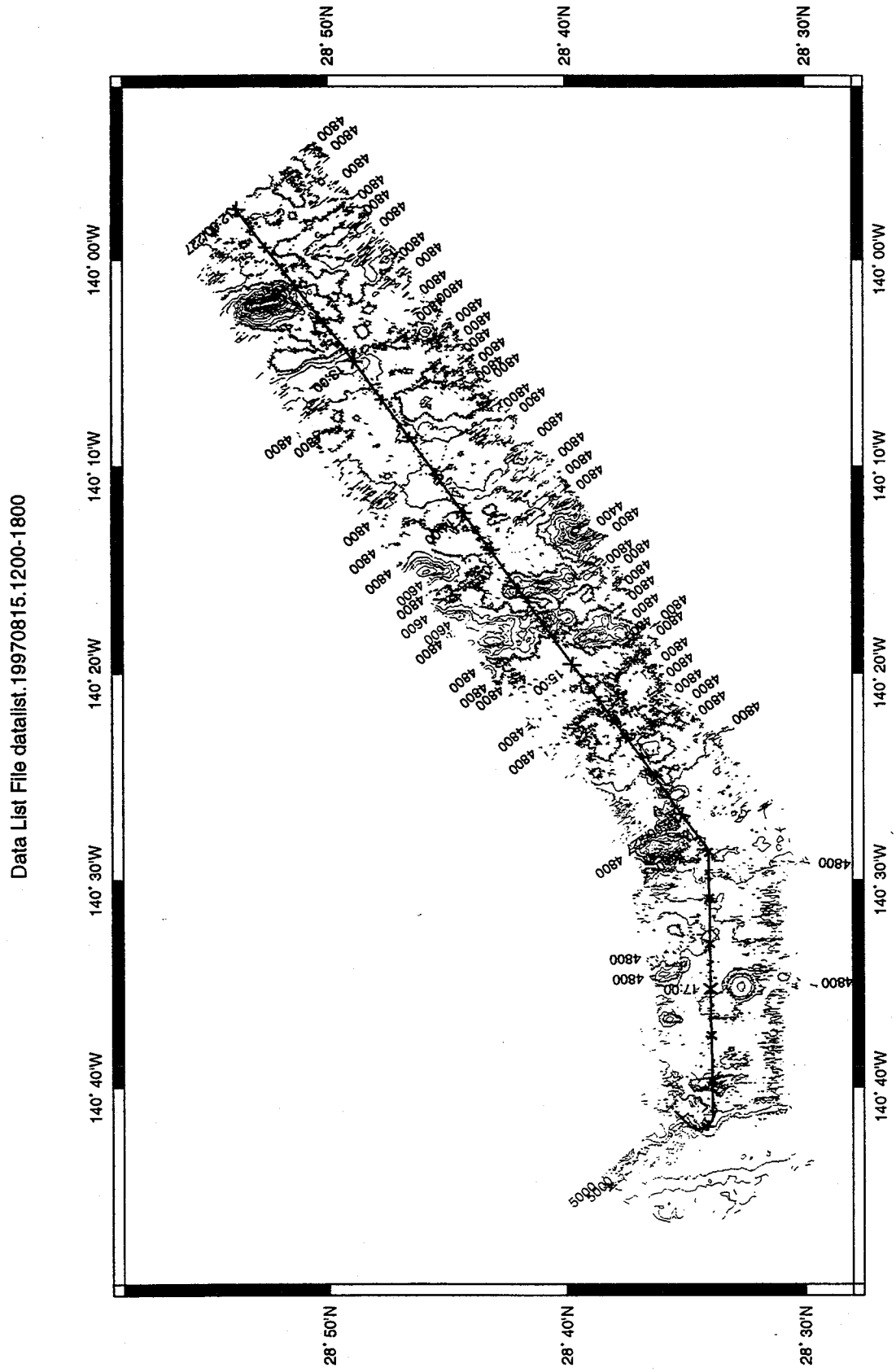
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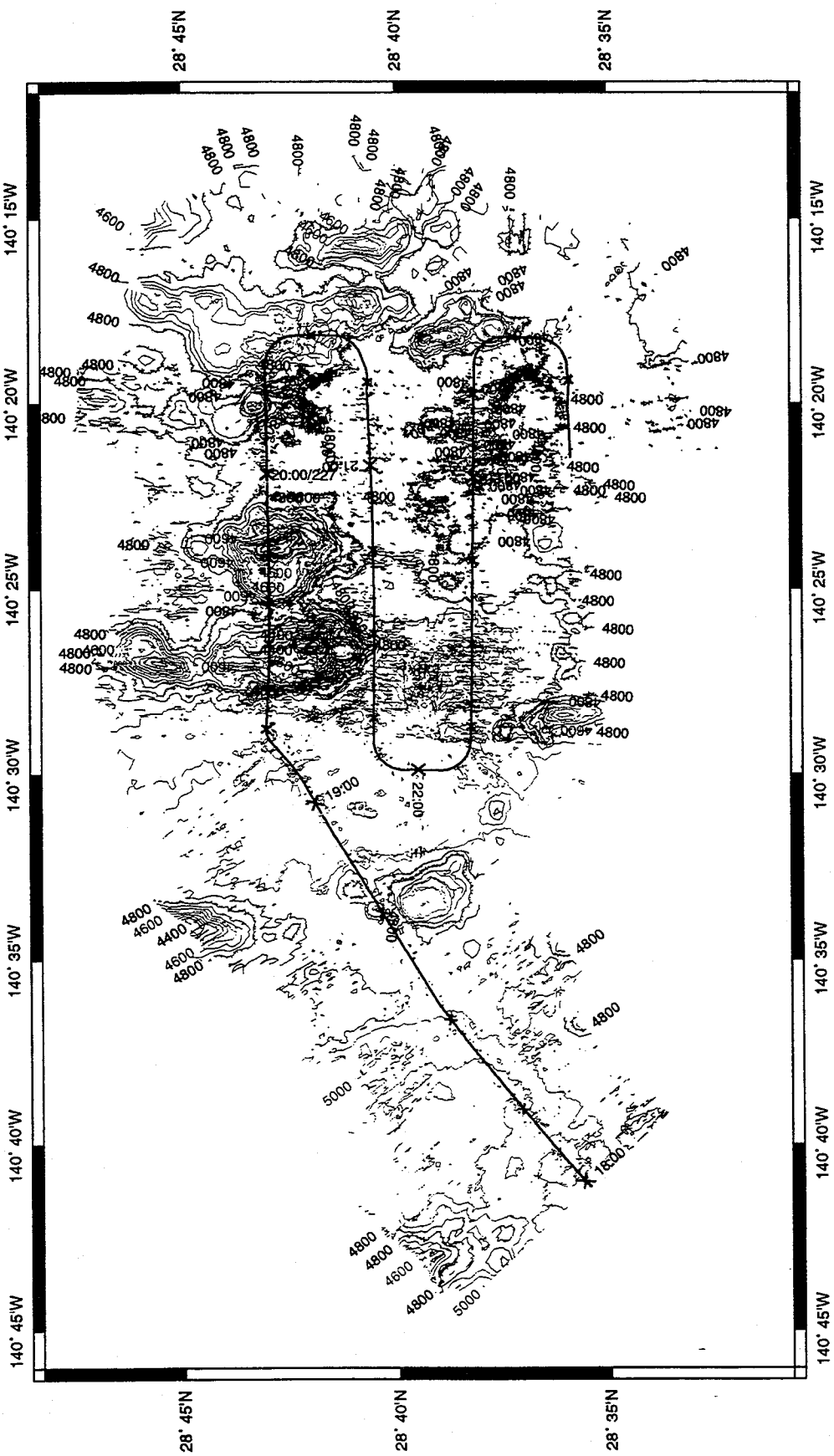

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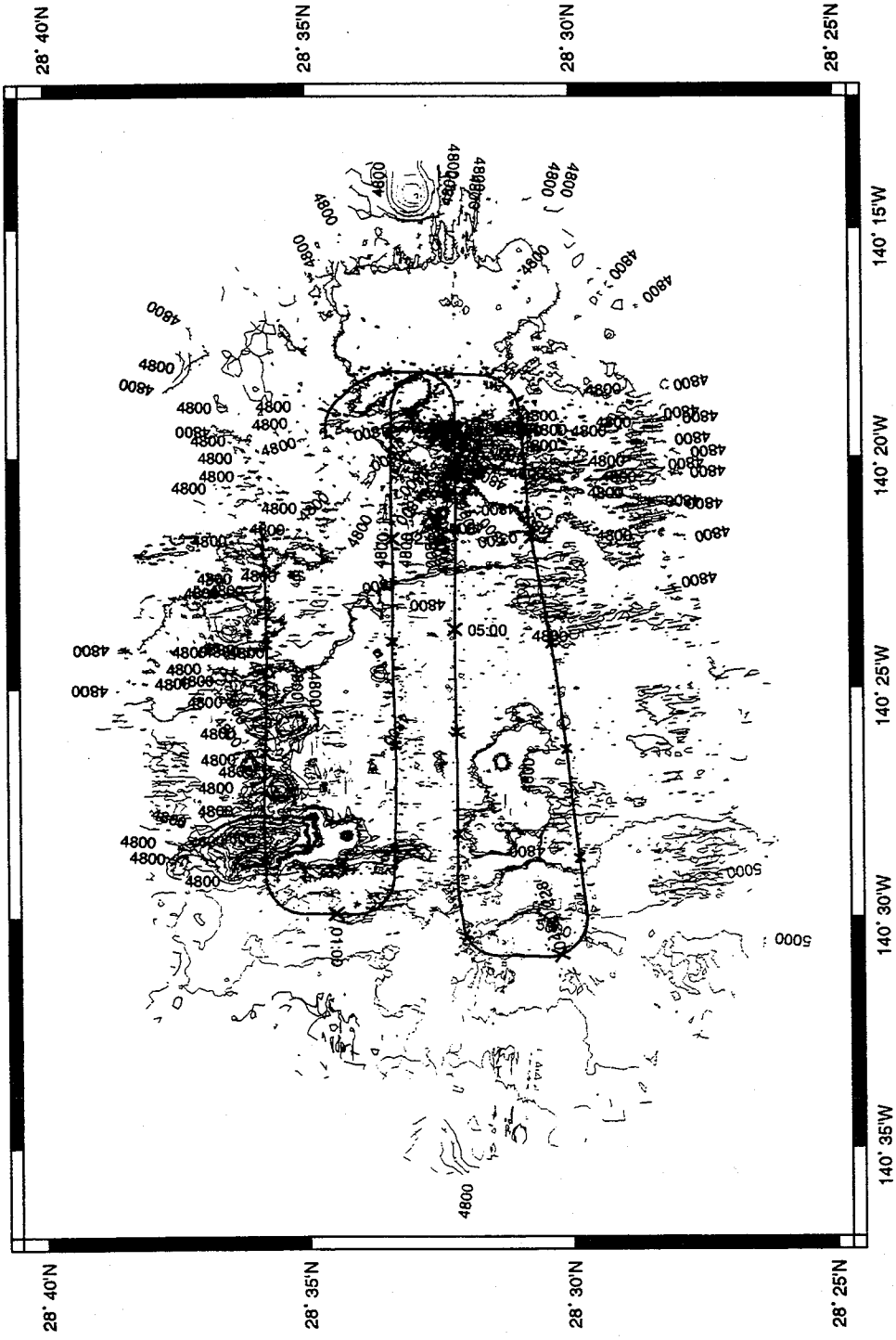

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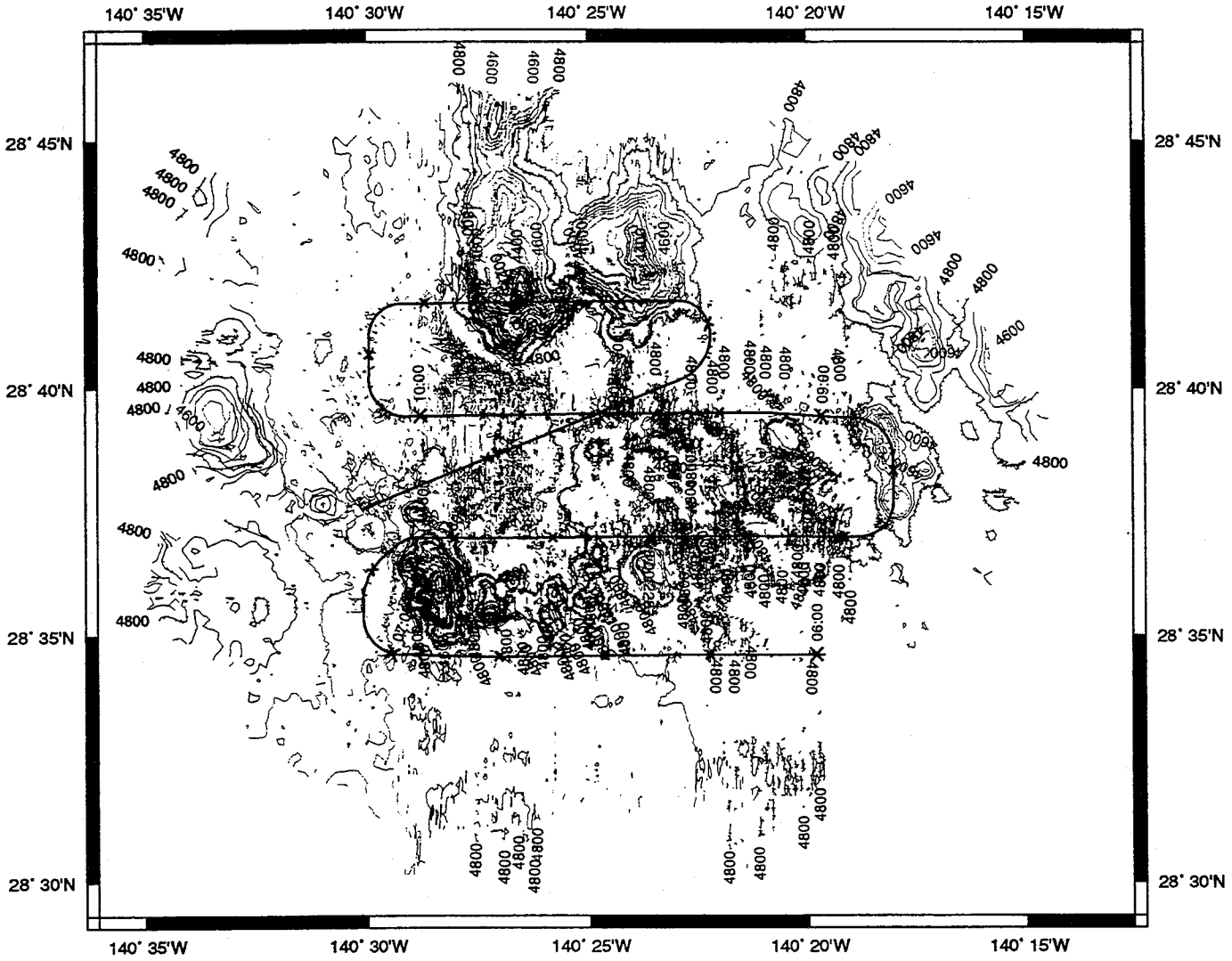

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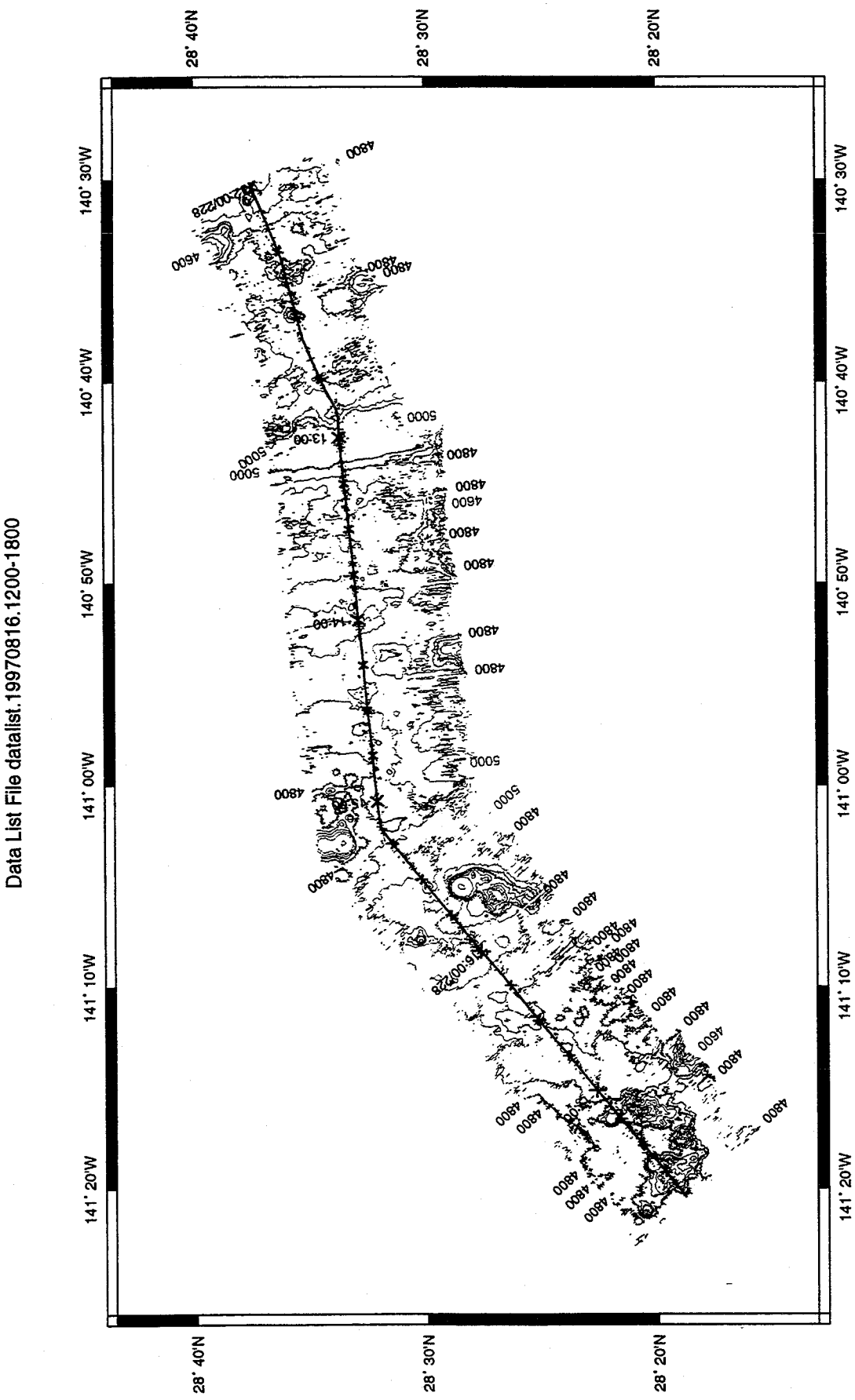

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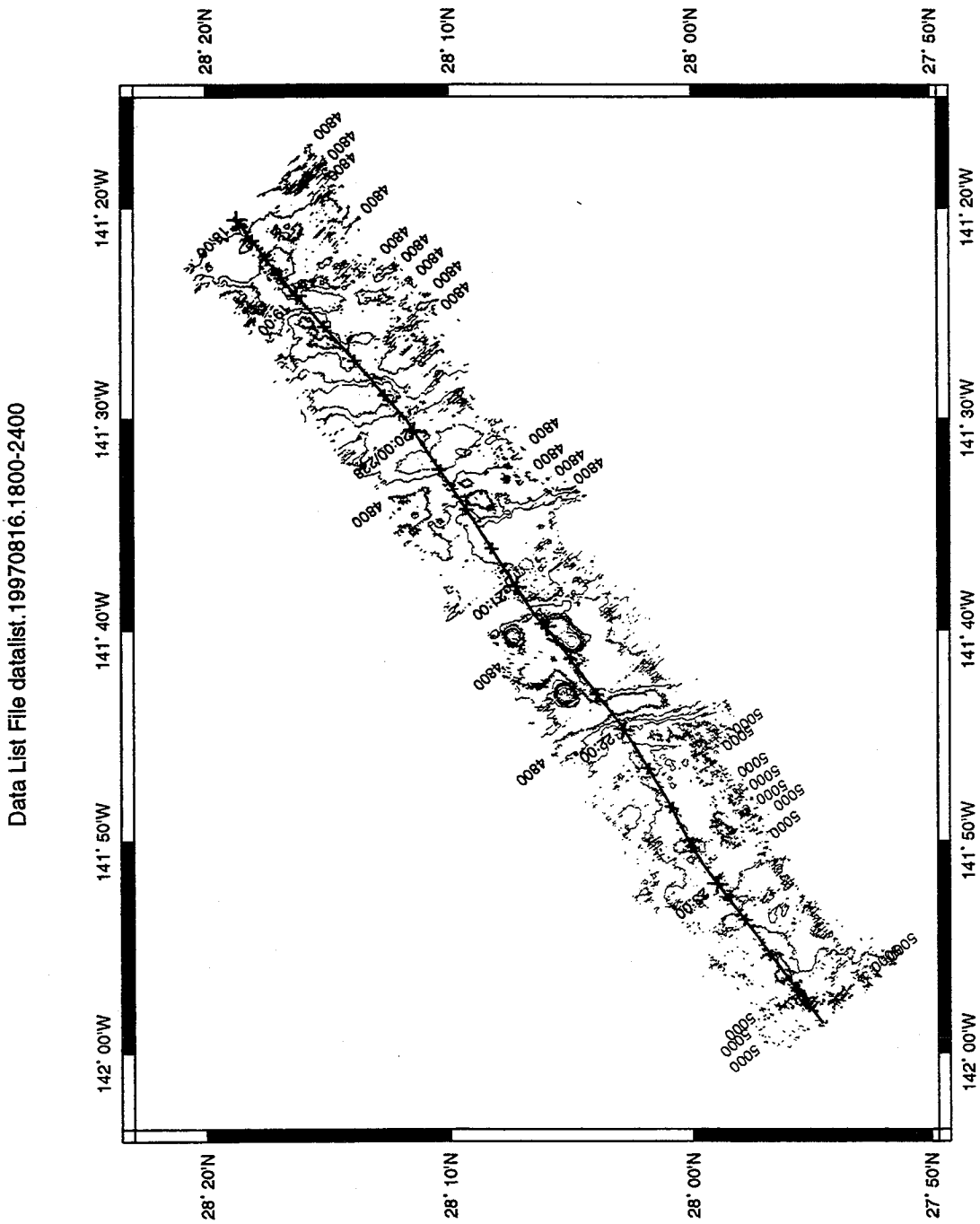
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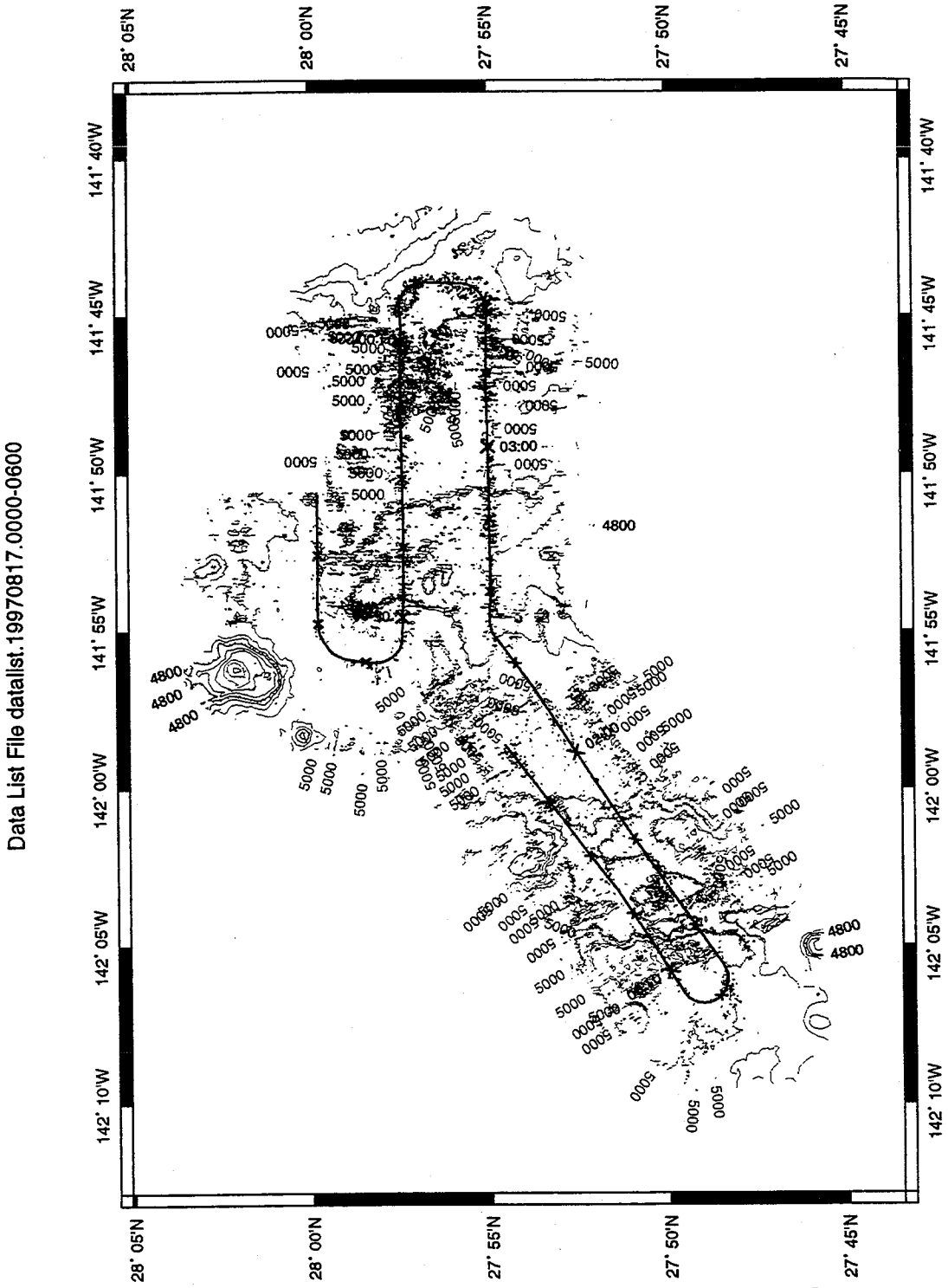
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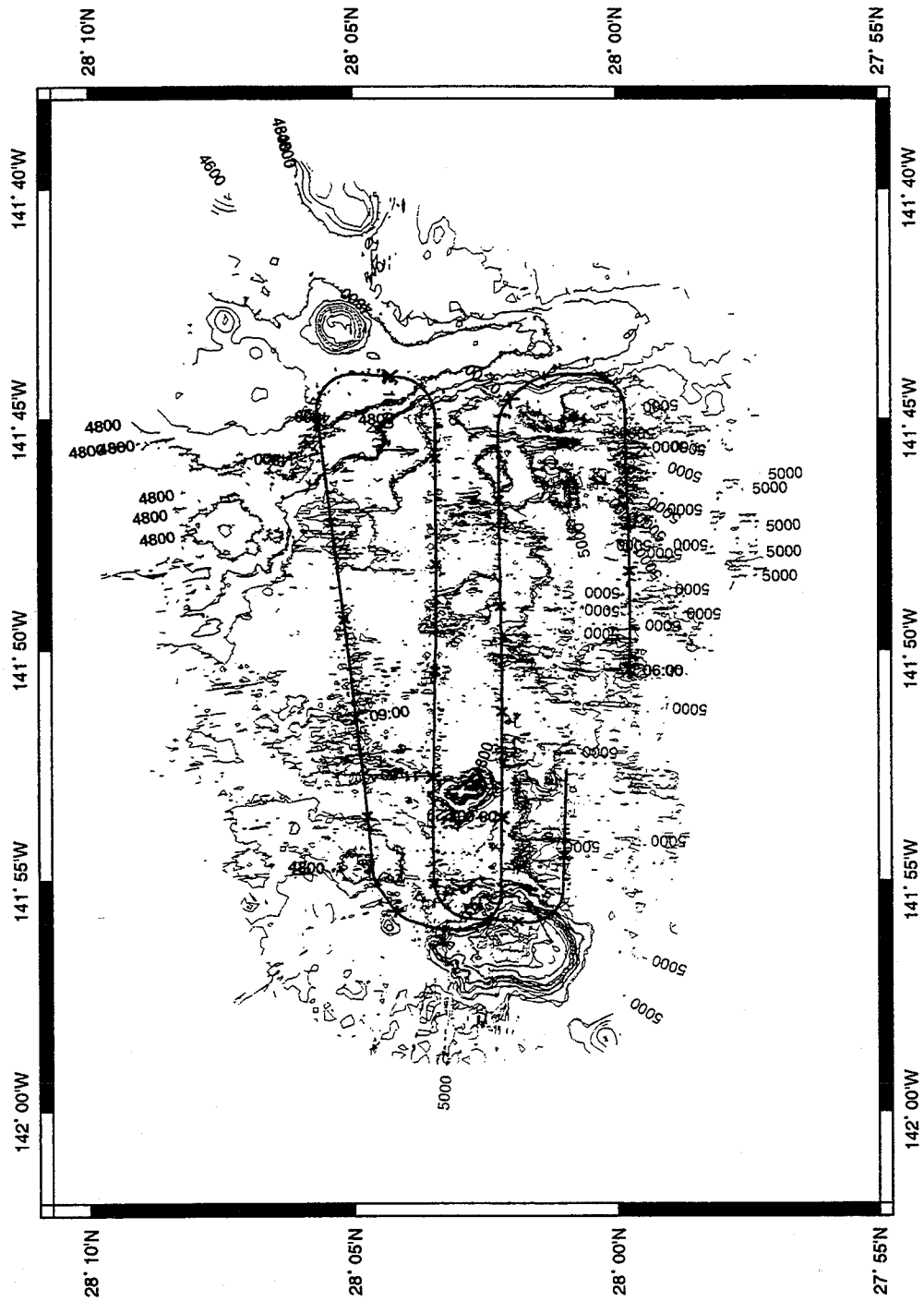

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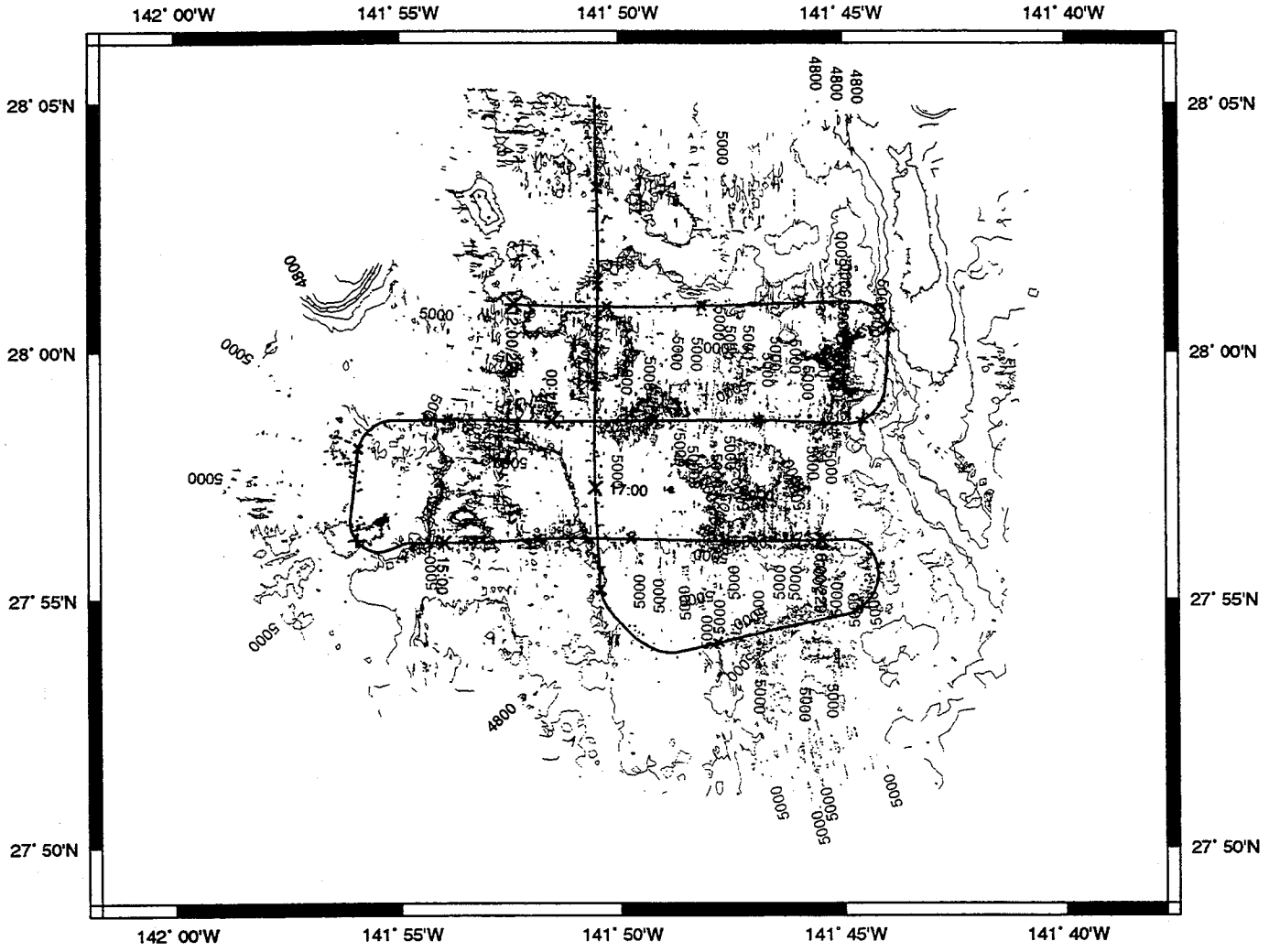

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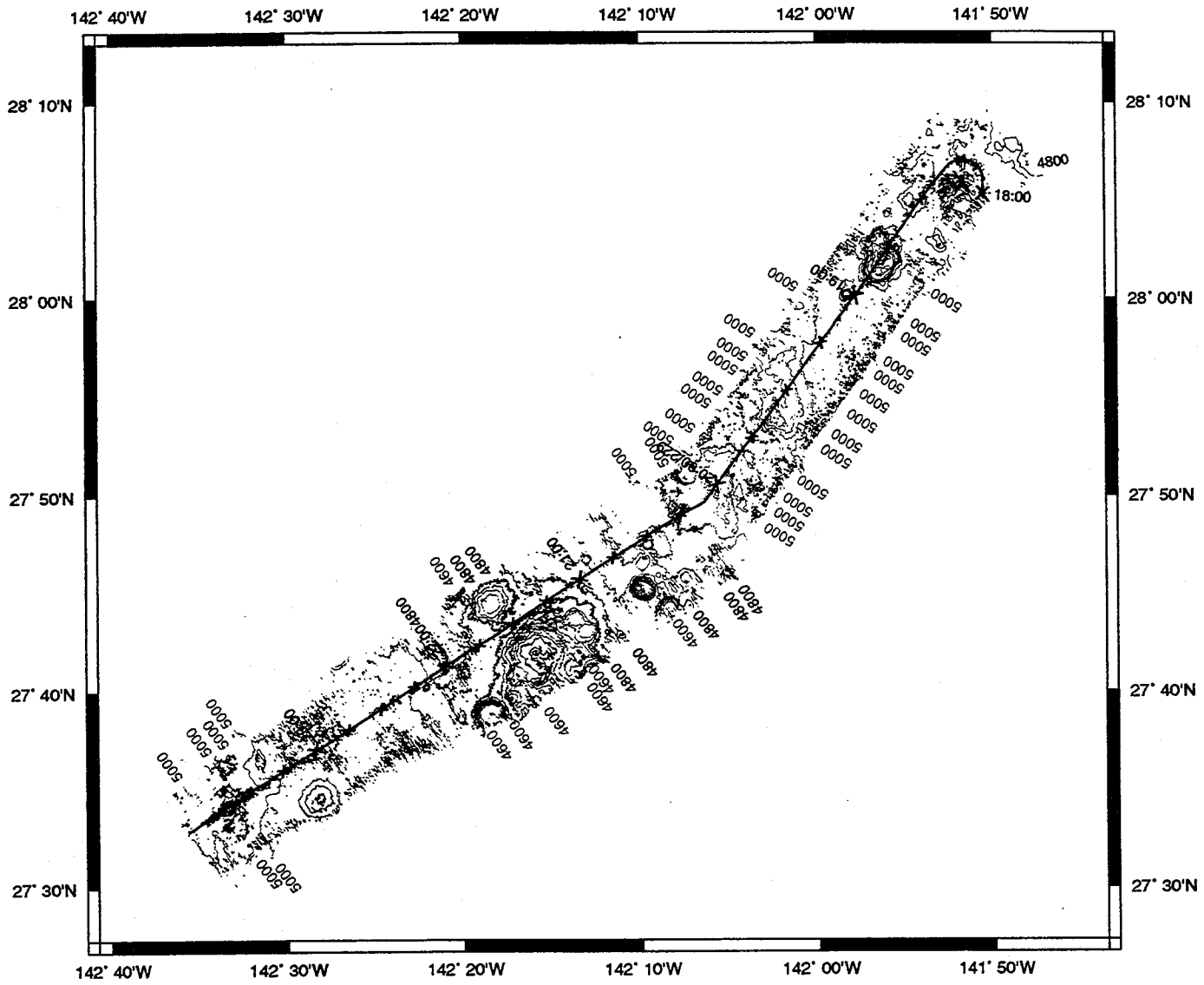

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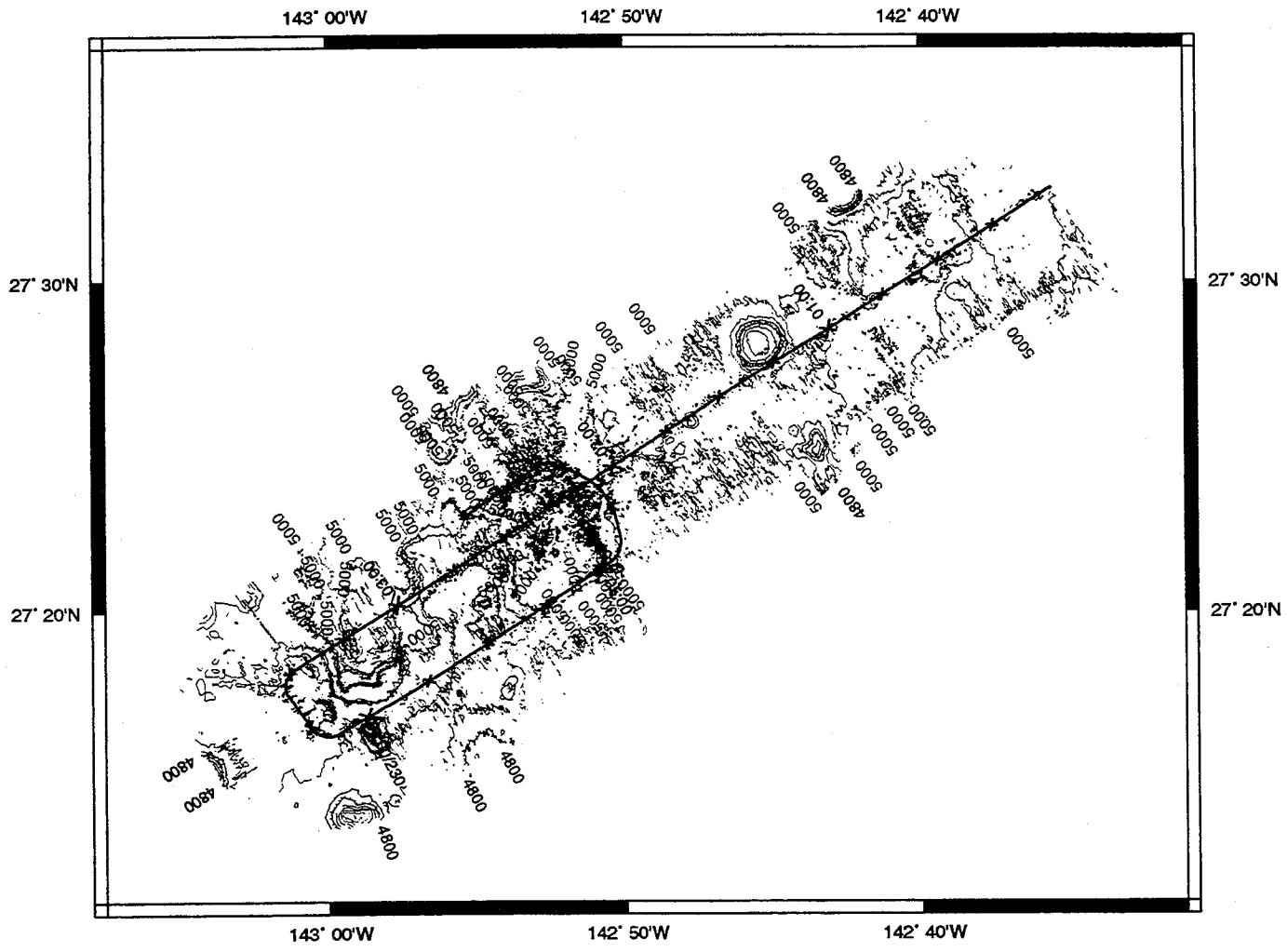

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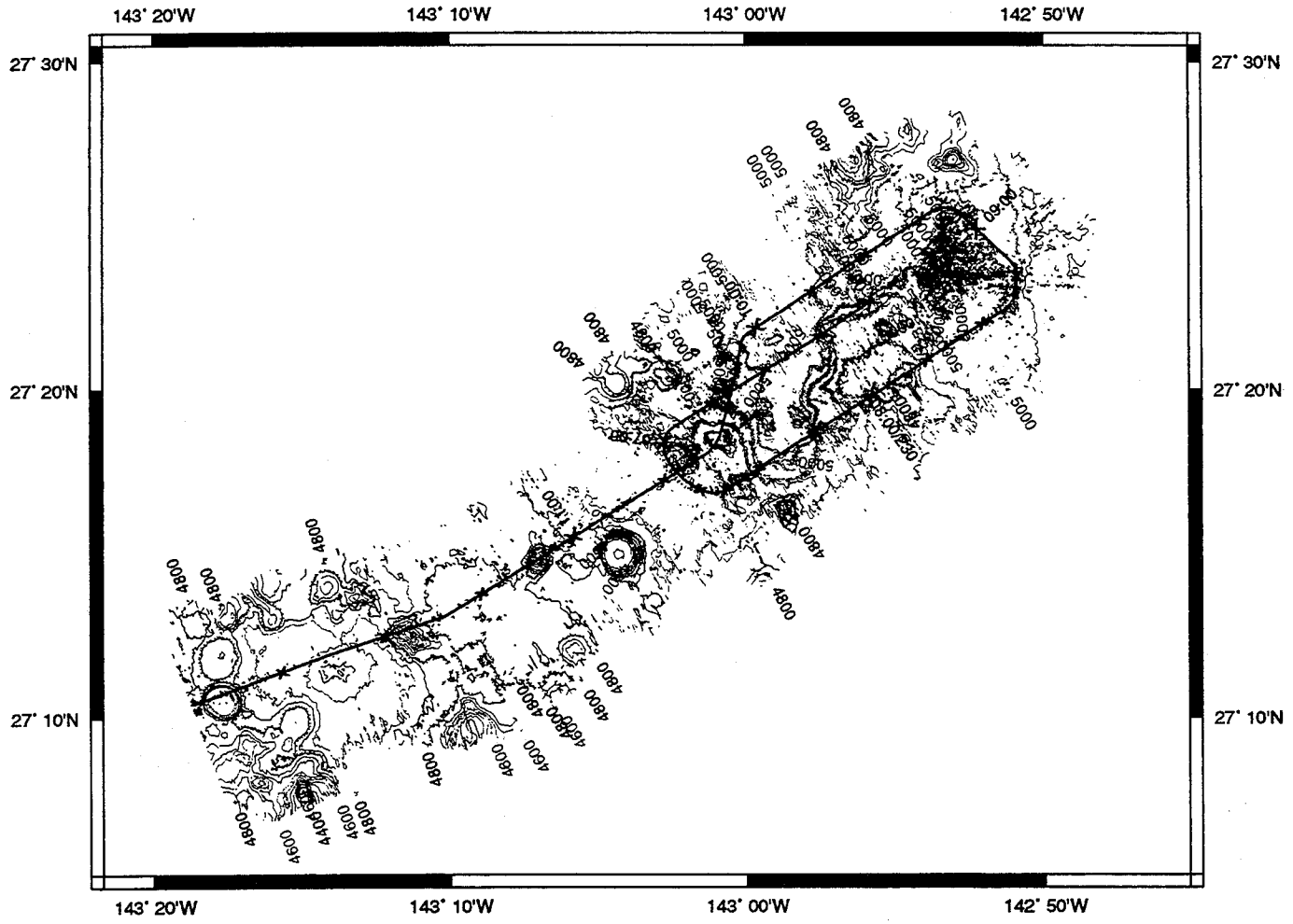

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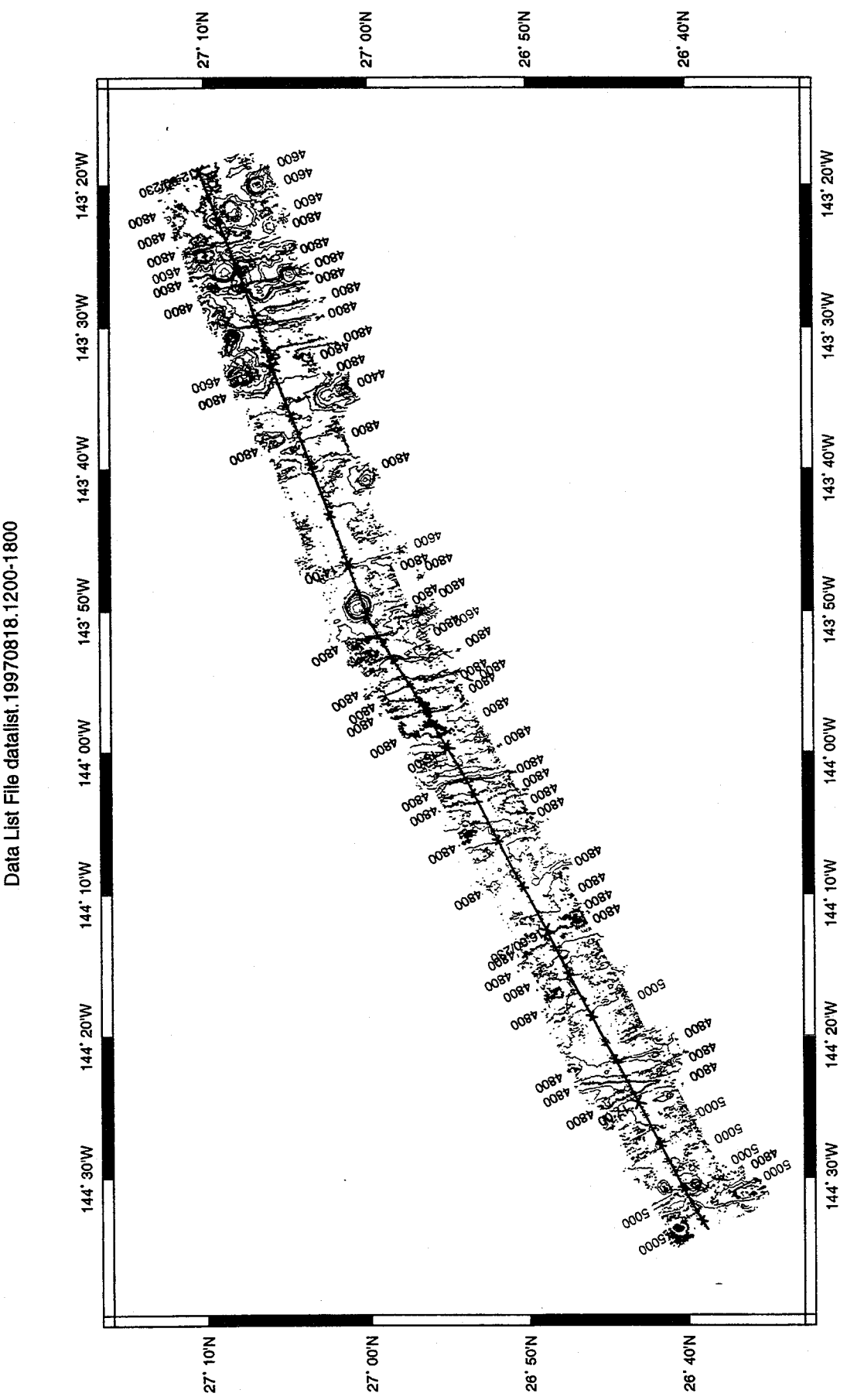

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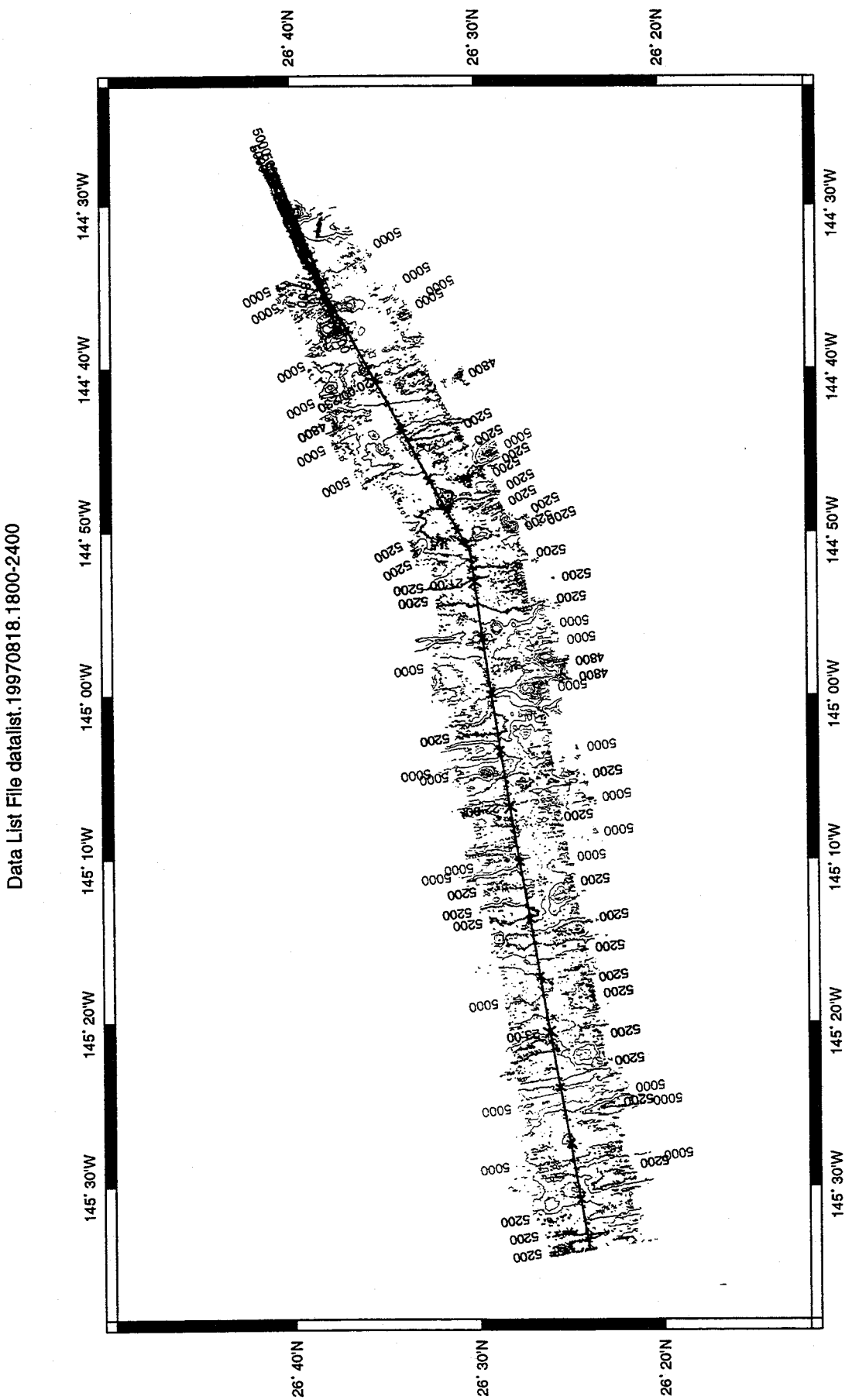
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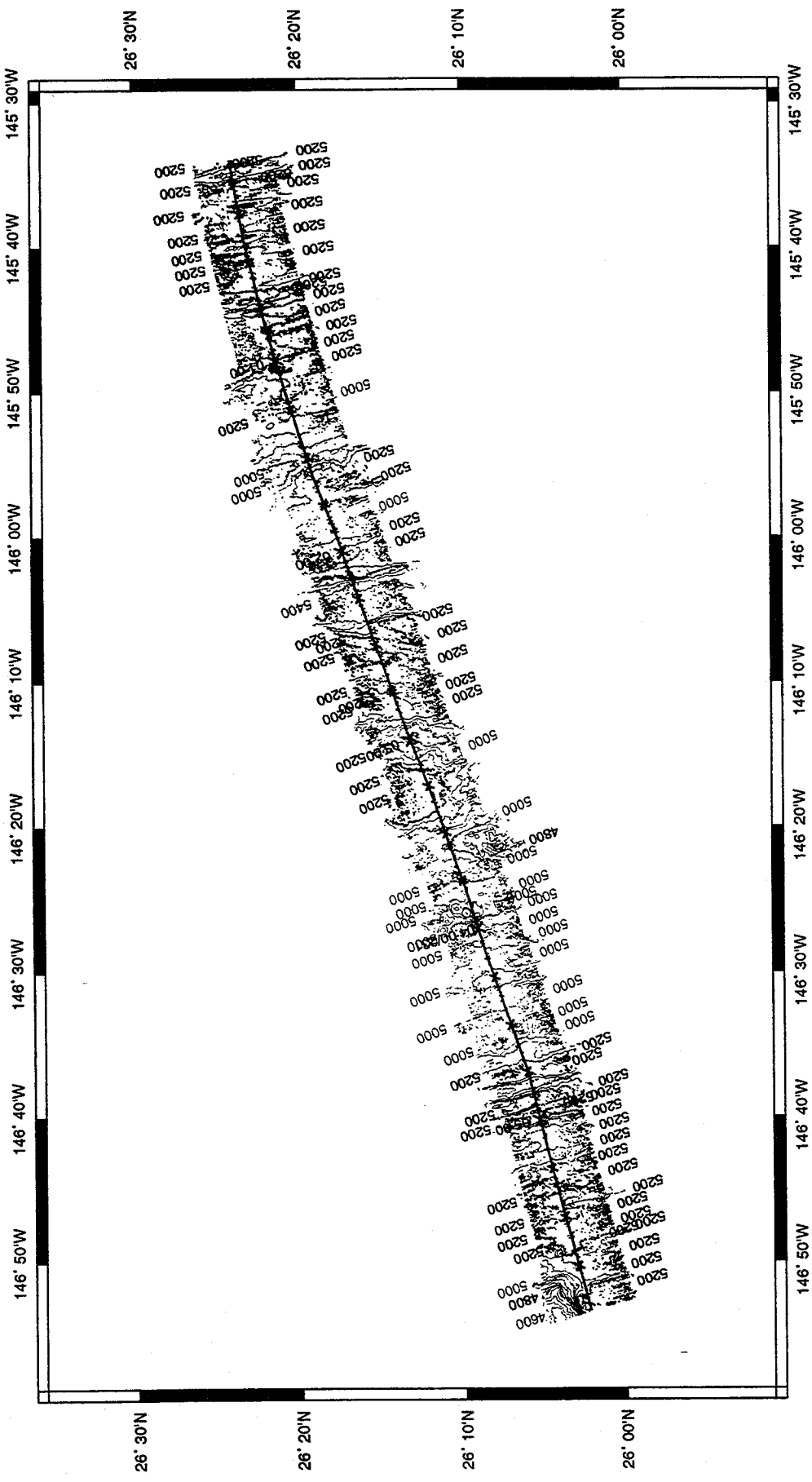
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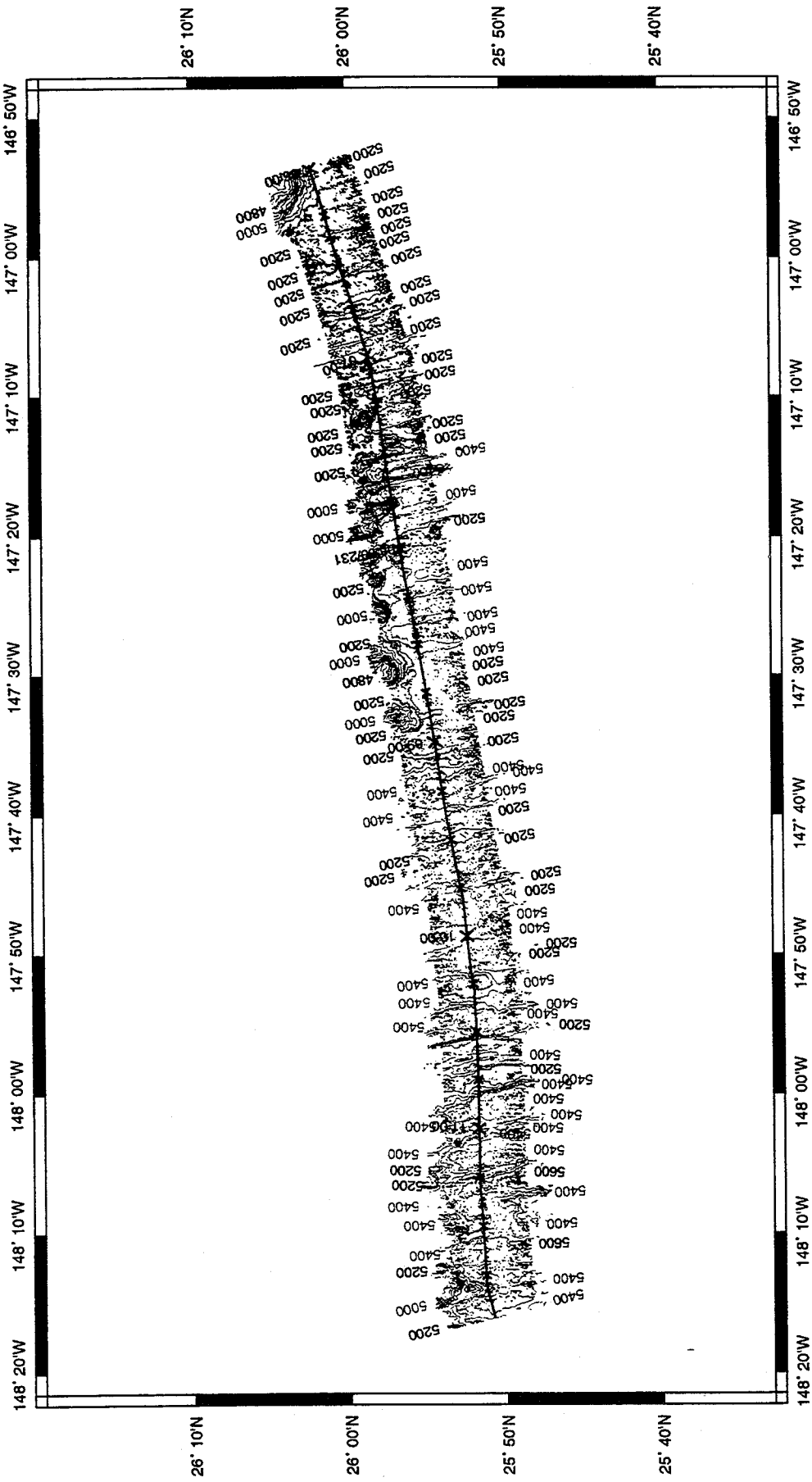
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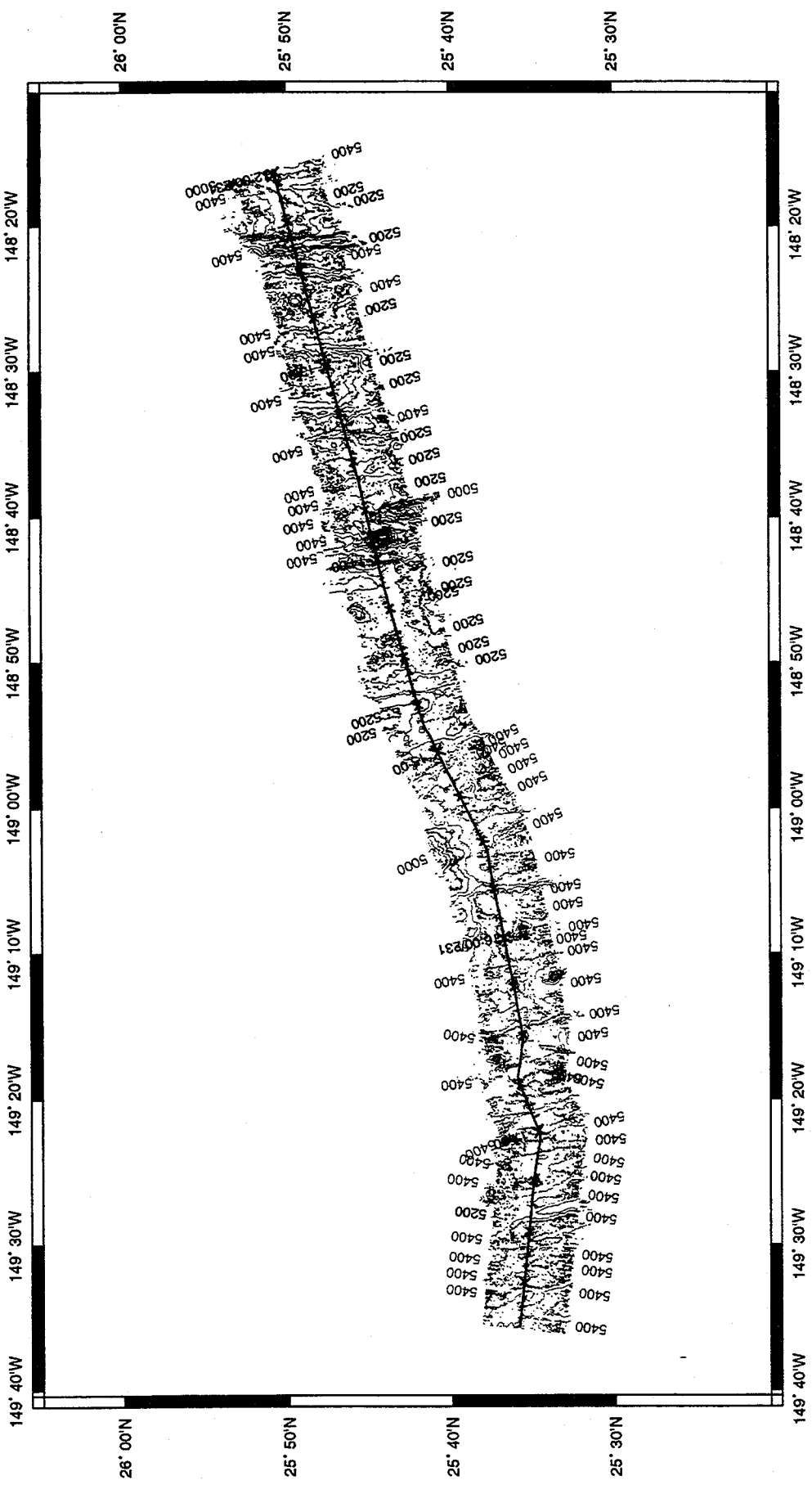
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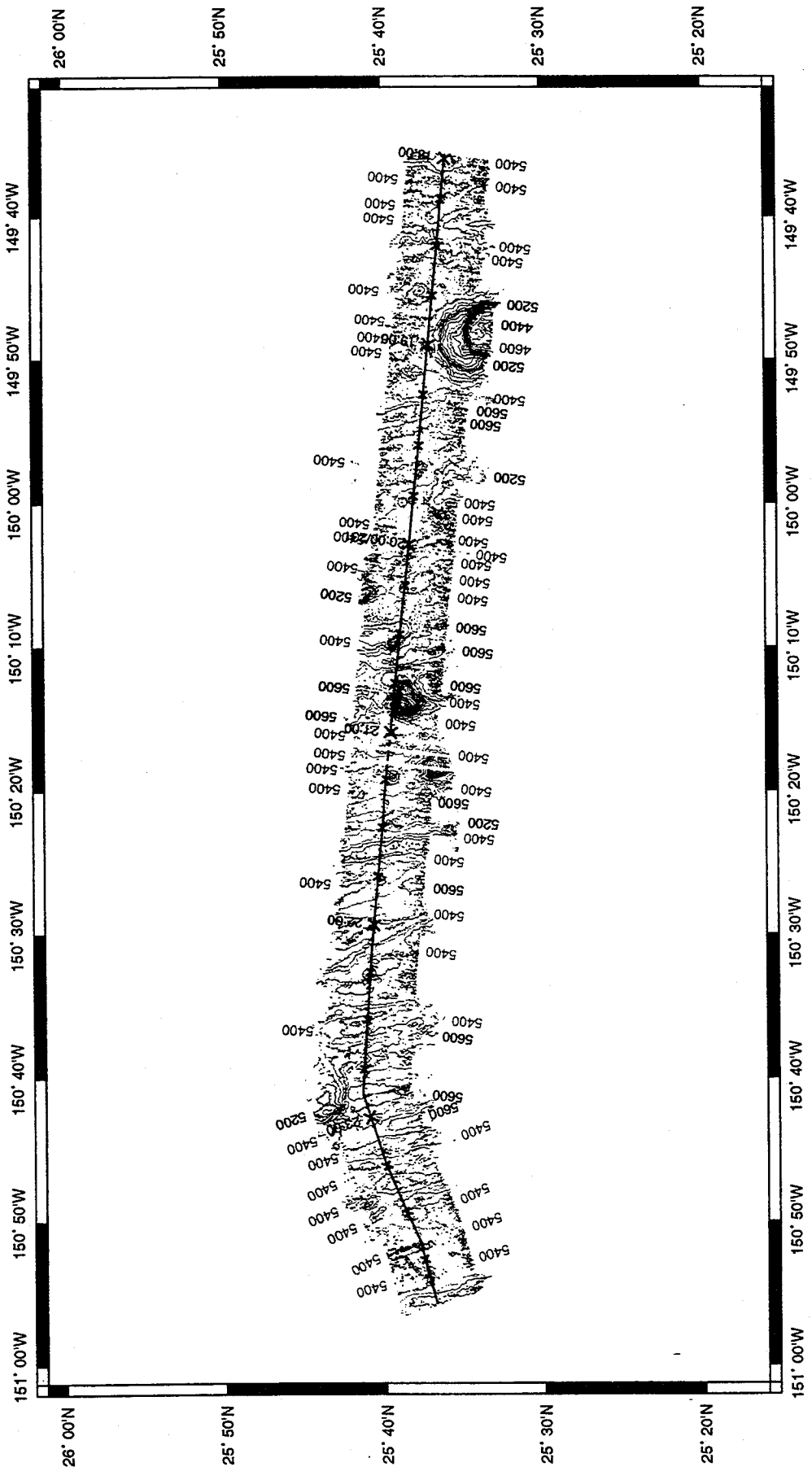
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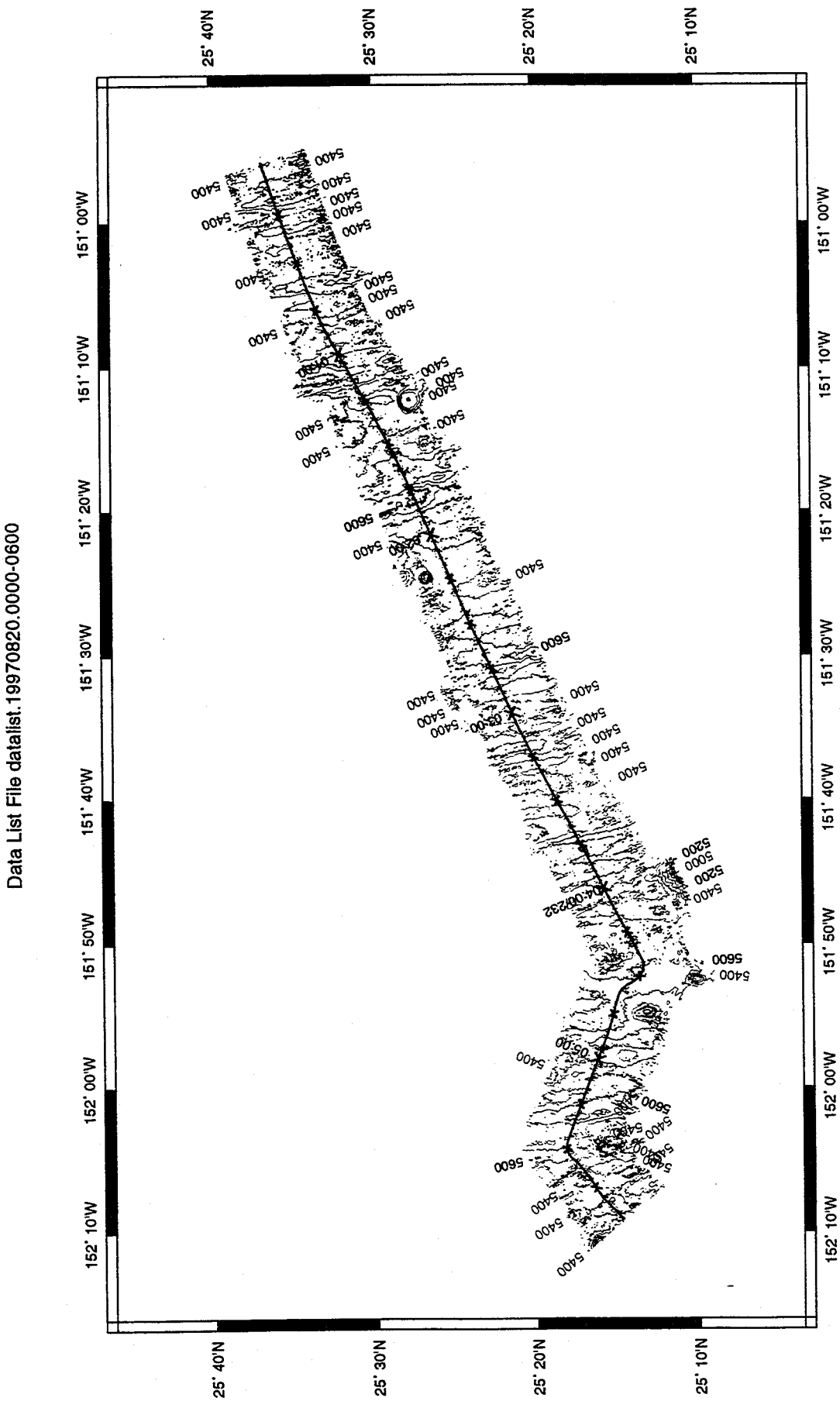
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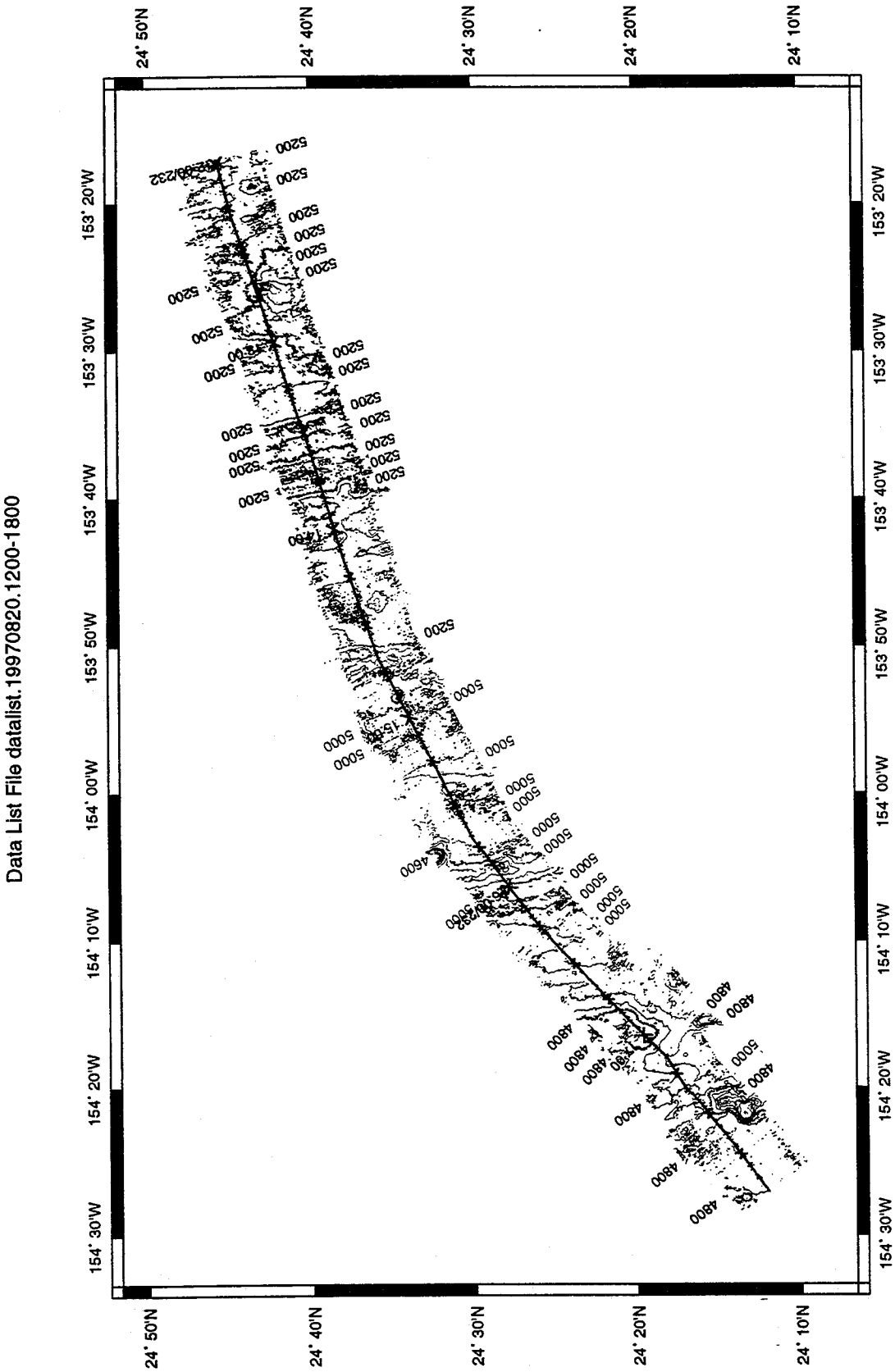
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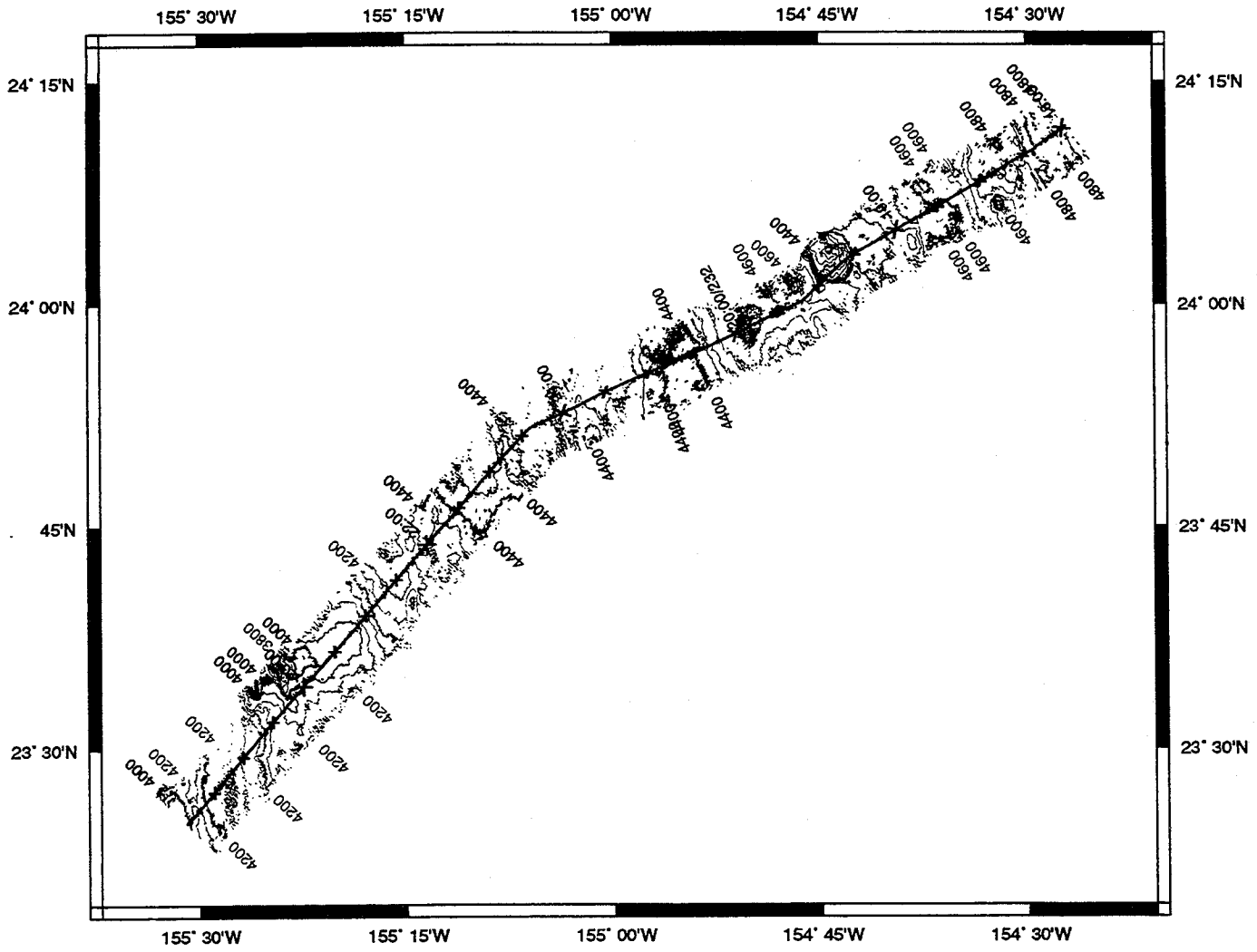
154° 20'W
154° 30'W

110

Data List File datalist.19970820.1800-2400



111

Data List File datalist.19970821.0000-0600